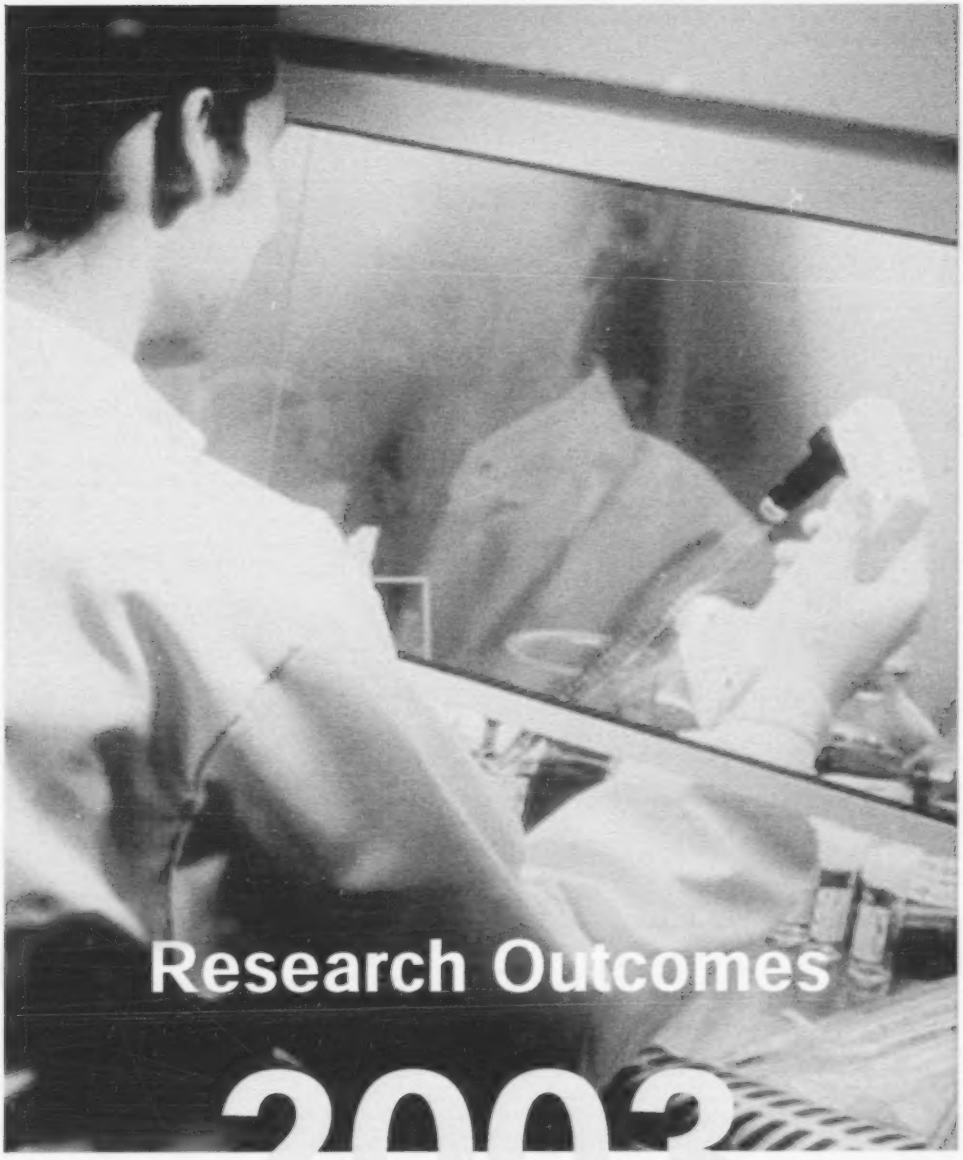
Alberta
INNOVATION AND SCIENCE

ASRA
Alberta Science and Research Authority

Alberta Science and Research Investments Program



Research Outcomes

2003 Annual Report

March 2005

CONTENTS

Annual Report 2003

Introduction 1

ASRIP: Research Outcomes 1

Constructing Knowledge Communities in Face-to-Face and Virtual Environments 2

Electrical and Computer Engineering Research Facility 3

Understanding Land Cover Through a Strategic Infrastructure Development 4

Medical Cyclotron Facility (Positron Emission Tomography - PET Research) 5

Solid-State Nuclear Magnetic Resonance Facility 6

Electospray Ionization - High Field Asymmetric Waveform Ion Mobility Spectrometry 7

Global Communications Centre of Applied Technology 8

The New Media Institute Human Centred Interface Design Project 9

Institute of Biomolecular Design (IBD) 10

Molecular Biology Infrastructure 11

Electronic Data Infrastructure Upgrade 12

Infrastructure for Shallow Geophysical Studies 13

Laboratory for Laser and Spectroscopic Applications in the Natural Resource Industries 14

Modern Infrastructure for Advanced Capabilities in Molecular Biology and Biotechnology 15

Infrastructure for Deposition and Charaterization of Combinatorial Arrays of Thin-Film Inorganic Compounds and Optoelectronic Devices 16

Figure 1 17

The Program 18

Appendix 1 20

Appendix 2 32

2003

ASRIP

Annual Report

Introduction

Alberta Innovation and Science and the Alberta Science and Research Authority are working together to unleash innovation. The strategic investments we are making today are the key to a promising tomorrow—to the realization of a diverse economy that derives lasting benefit from the inventive spirit and entrepreneurship of its research and innovation system.

We recognize that unleashing innovation requires building research capacity and capability. Our goal is to ensure that the Alberta's researchers acquire cutting-edge tools and conduct innovative science in world-class centres of excellence.

We are working diligently to address the growing demand for modern research infrastructure through key programs like the Alberta Science and Research Investments Program (ASRIP)—a competitive funding program that supports selected science and research initiatives of strategic importance to Alberta.

ASRIP focuses its investments in the areas of energy, life sciences, and information and communications technology. This focus is ensuring that Alberta's research system is strategically enhanced and well-positioned to recruit and retain excellent people—the scientists, technicians, graduate students and emerging entrepreneurs that are integral to unleashing innovation.

ASRIP: Research Outcomes

This annual outcomes report highlights selected ASRIP investments that have supported successes in modernizing university research infrastructure, building capacity, recruiting top quality researchers and leveraging research funding. The report also outlines ASRIP's cumulative investments through funding competitions held between 2000 and 2003.

Through this period, ASRIP strategically invested over $66.9 million in 85 key projects that have significantly increased research capacity in Alberta. The total value of these projects was over $318.3 million with the remainder of the funding coming from the Canada Foundation for Innovation, the private sector, and non-Alberta government sources.

As this report illustrates, ASRIP has also served as an important mechanism for leveraging funds from the federal Canada Foundation for Innovation (CFI) and from the private sector and other sources in order to maximize the research dollars flowing into Alberta.

The Alberta government recognizes that it must invest wisely to compete with other jurisdictions nationally and internationally to effectively build the province's research capacity, and ASRIP is proving to be a integral means to ensuring that the right investments are indeed being made—ones that promise a successful return for our future. In fact, the highlighted projects that you will read about in this report are evidence that Alberta's research investments are already placing the province at the forefront of the new knowledge frontier.

Following on the highlighted projects (pages 2 to 16), this report also provides more details on ASRIP's competitive process as well as a comprehensive listing of projects and breakout of strategic investments (pages 17 to 41).

S&R 99-48 ***'Constructing Knowledge Communities in Face-to-Face and Virtual Environments'***

The Galileo Educational Network (GENA) is pioneering the transformation of learning through the creative and effective use of technology. It has created vital learning communities across Alberta by providing the vision and leadership required to create systemic change in schools. The work done by the Galileo Educational Network has no peers nationally, and is receiving increasing attention internationally as well.

Carefully evaluated in each of its first three years of operations, GENA has exceeded every target established in its initial ASRA proposal to create change by:

1. Developing a province-wide network of schools committed to finding new ways to teach and learn in a technological age
In its first year, GENA worked in 3 schools, each located in a different school district. By May, 2002 that number of districts had increased to 10, with more than 20 schools from Grande Prairie to the foothills and teachers working closely with GENA to create new learning environments for students. In small schools and large, urban and rural, teachers who worked with GENA did, indeed, establish a provincial network of peers who continue to make exciting progress in transforming learning environments for students.

In addition, large numbers of teachers intrigued by inquiry-based learning in mathematics have come together over the years to work specifically on mathematics, most recently in partnership with The Pacific Institute for the Mathematical Sciences and Mount Royal College.

2. Providing job embedded professional development for teachers
Traditionally, teachers have learned how to use technology by taking courses or attending workshops, where they would acquire skills they were expected to be able to implement without difficulty when they returned to their classrooms. Research indicates that is an ineffective a model for teacher growth. In Alberta, GENA pioneered the idea that change happens when people work right along side teachers in their schools and classrooms, helping them first to design deeply engaging inquiries for students, and then to explore the possibilities for technology that those inquiries open up. GENA was also the first professional development organization in the province to tie the effectiveness of professional development directly to student outcomes. In conventional terms, people often think of student achievement only in terms of scores on paper and pencil examinations. While relatively easy to collect and share, such measures tell us little about what young people are able to accomplish when they have access to the kinds of powerful technological tools that are so much a part of our world today. A major accomplishment for GENA has been to find ways to highlight new images of student achievement.

3. Creating a highly personalized virtual learning environment for teachers
One of GENA's most exciting achievements was realized in February 2001, when a partnership was formed between the Galileo Educational Network and Axia NetMedia. Together, they have created IO - (Intellegence Online), a professional online learning environment for teachers (www.myio.org). Within IO, teachers are guided through an inquiry-based design process as they create authentic learning tasks for their students and develop performance assessments for their task. IO provides teachers with the tools and processes to choreograph a complex inquiry-based learning environment, and to communicate and learn with other members of the IO community.

The Institution:	*The Galileo Educational Network Association*
Lead Scientist:	*Dr. Patricia Clifford*
Funding Partners:	*IBM, IKON Office Solutions, Shaw, Alberta Learning, Alberta School Divisions*
ASRA Funding:	*$600,000*
Total Project Cost:	*$4,954,000*

IIPP 300-10-1-10 ***'Electrical and Computer Engineering Research Facility'***

The Electrical and Computer Engineering Research Facility (ECERF) provides 16,500 m2 of space for engineering research activities in the areas of information technologies, telecommunications, computer/software engineering, advanced laser applications, microelectronics and microfabrication. Research and laboratory space is provided for a total of 50 engineering faculty members (soon to be over 60 faculty), over 300 graduate students, 40 postdoctoral fellows and research associates and 20 associated support staff.

A special feature of the ECERF is the large cleanroom facility (the nanofab) on the main floor that supports internationally recognized research in the areas of nanotechnology and micro systems. The nanofab has become a major magnet in attracting additional research partners, faculty and graduate students. The existence of the ECERF has also resulted in many recent CFI grants, WED grants, NSERC grants, and industrial contracts. As an example, the nanofab now contains over $15 million of specialized equipment in support of nanotechnology research and development.

The facility is the "home" for the Department of Electrical and Computer (ECE) Engineering. In addition, the ECERF 7th floor has been leased to TRLabs for use as their overall corporate headquarters and Edmonton-based research activities. This results in the ECERF supporting the many industrial partners of TRLabs. Further, the ECERF 6th floor has been leased to the National Research Council as the interim home of the National Institute for Nanotechnology (NINT).

The construction and outfitting of the major cleanroom facilities in the ECERF, and the establishment of the nanofabrication facilities, were instrumental in attracting Federal Government and Government of Alberta support for creating the National Institute for Nanotechnology. The establishment of NINT is a cornerstone in the creation of a major Canadian and Alberta presence in the forefront field of nanotechnology -a field that is predicted to be a major contributor to the economy in the future.

The nanotechnology activities in the ECERF provide a platform technology in support of the major Alberta priority areas of Energy, ICT and Life Sciences.

The location of the nanofab in the main floor of the ECERF has supported both the faculty-based discovery research as well as a broad spectrum of commercialization activities. This has resulted in the creation of a number of spin-off companies as well as interactions with established companies. These companies include: Micralyne, BigBangwidth, ZiMARC, Geneflex, Indexable Cutting Tools, Applied Genosystems, National Advanced Coatings, Motorola, DB Robinson, Aurora Nano Devices, ChiralTF, Logican, Guigne International, Telephotogenics, Alberta Research Council, Callessa Solutions, Norcada, and CREO.

The ECERF has become a major shared resource within and beyond the University of Alberta. In addition to NINT and TRLabs, the ECERF has supported over 500 users, from more than 90 user groups, from 17 University of Alberta departments, from 6 universities, and from 18 companies. It has truly been a magnet in attracting research partners.

Cleanroom facility (the nanofab) for research in the areas of nanotechnology and micro systems.

The Institution:	*University of Alberta*
Lead Scientist:	*Dean David Lynch*
Funding Partners:	*Canada Foundation for Innovation, Western Economic Diversification, Natural Sciences & Engineering Research Council*
ASRA Funding:	*$4,200,000*
Total Project Cost:	*$10,500,000*

URSI-01-047 '***Understanding Land Cover through a Strategic Infrastructure Development***'

ASRIP funds enabled the acquisition of a high-end back-up system that was connected to the Earth Observation System Laboratory (EOSL). In addition, funds allowed for the purchase of a field spectrometer Analytical Spectral Device (ASD) for state of the art collection of spectral signatures.

The new infrastructure supported research and development for three main research projects:

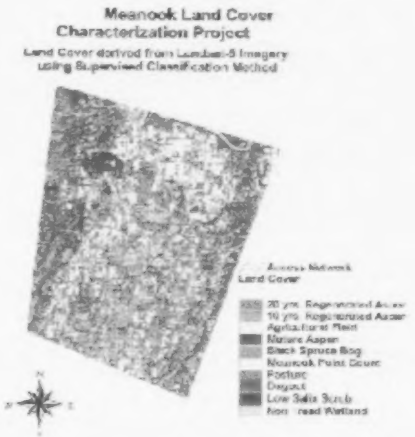
a) Geological Applications of Remote Sensing: This component of the infrastructure implemented a new technique for automated geological analysis of rock cores using remote sensing. The spectrometer purchased was used for the development of new techniques for hyperspectral remote sensing platforms in the geological mapping of artic and sub-artic regions of Canada.

b) Land Use and Cover Change in Boreal and Tropical Regions: New techniques were developed for mapping forest resources in Alberta and the tropical dry forests of Mesoamerica. In Alberta, the infrastructure has been used to support a joint initiative called the Alberta Ground Cover Characterization (AGCC) project, which will provide the most up-to-date, accurate and high resolution pictures of land cover types for the province.

c) Land Cover Dynamics on High Arctic Environments: This project is one of the main thrusts of the EOSL in terms of supporting mapping of land cover in the high arctic using a new generation of NASA Satellites. This project, named GLIMS, is providing first-time pictures of the impacts of global change on Canadian glaciers by means of remote sensing interpretation.

The project has helped to build bridges between the natural and social sciences by means of interdisciplinary and inter-institutional research. The infrastructure has also been of great significance in terms of attracting and retaining graduate students, allowing the EOSL to increase its research capacity. Currently, the infrastructure is supporting a total of 13 graduate students (M.Sc. and Ph.D. level) and 3-Post Doctoral fellows. In addition the infrastructure has allowed for the retention of 2 undergraduate students from the Earth and Atmospheric Sciences Department who were hired upon their graduation as full-time research assistants.

The infrastructure has also enabled associated researchers to successfully seek funds at the national and international level. At the national level, support from the Natural Sciences & Engineering Research Council, Networks of Centres of Excellence Sustainable Forest Management Network and GEOIDE has been crucial to the success and long-term maintenance of the infrastructure. Support from the Canadian Space Agency and the Canadian Forest Service has also been key. In addition, international support has been attracted from the United Nations and private organizations, such as Tinker Foundation. Successful applications to these funding sources could not be possible without the infrastructure supported by this ASRIP grant.



The Institution: *University of Alberta*

Lead Scientist: *Dr. Arturo Sanchez-Azofeifa*

Funding Partners: *Natural Sciences & Engineering Research Council, Networks Centres of Excellence - GEOIDE, ALPAC Inc., Canadian Space Agency, Tinker Foundation*

ASRA Funding: *$350,000*

Total Project Cost: *$781,189*

S&R 99-01A ***'Medical Cyclotron Facility (Positron Emission Tomography - PET Research)'***

Alberta physicians and hospitals that currently must go out of province to buy isotopes necessary for Positron Emission Tomography (PET) scanning, now have quick access to those isotopes, thanks to a new facility at the Cross Cancer Institute in Edmonton.

In PET scanning, patients receive a dose of a radioisotope containing substances that mimic those normally used in the body, including water, sugar, proteins and oxygen. These radioisotopes accumulate in diseased cells differently than they do in healthy cells. The patient is then scanned using a PET camera which translates data into computer images. This picture helps doctors locate and determine the extent (or stage) of a disease and track how rapidly tumors are growing. It also is valuable for monitoring the progress of cancer treatment such as chemotherapy, radiation therapy, and for monitoring patients for recurrence of cancers.

A *Cyclotron* is a particle accelerator. The medical cyclotron, purchased with the help of Government of Alberta funds, produces the radioscopes used in PET scanning. Due to radioactive decay, some of the very short-lived cyclotron produced radioscopes must be administered to the patient very soon after production. Hence, the cyclotron was built adjacent to the PET in the new Centre for Biological Imaging and Adaptive Radiotherapy (CBIAR) at the Cross Cancer Institute. The 10,000 square foot addition (on two floors) is a tangible example of the Alberta Cancer Board's continuing commitment to providing Albertans with Canada's best cancer care.

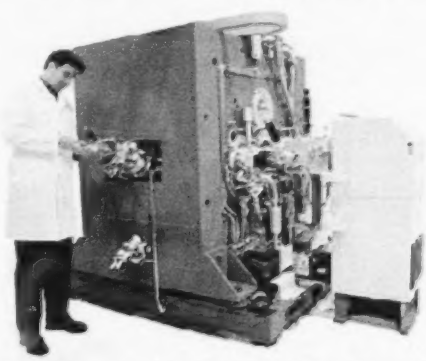
The developmental chemistry laboratory, adjacent to the cyclotron in the basement of the new facility is currently supporting three principal investigators.

"This new centre is the beginning of a new chapter in ACB's continuing efforts against cancer", said Gary Campbell, Chair of the Alberta Cancer Board. "We couldn't have done it without the support of our staff, our funding partners and the Alberta government".

This *Cyclotron* is the first hospital-based cyclotron in western Canada and is one of only six across the country.

The Cross Cancer Institute is a free-standing comprehensive cancer centre that serves Edmonton and northern Alberta, providing tertiary level diagnostic and treatment services and conducting cancer research and participating in professional education.

The PET scanner reads small, safe amounts of specific radioactive tracers



Cyclotron used to generate short-lived isotopes for the PET scanner.

The Institution:	*The Cross Cancer Institute*
Lead Scientist:	*A.J.B. McEwan*
Funding Partners:	*Canada Foundation for Innovation, Alberta Cancer Foundation, General Electric, University of Alberta*
ASRA Funding:	*$2,200,000*
Total Project Cost:	*$6,654,800*

URSI-01-041 '***Solid-State Nuclear Magnetic Resonance Facility***'

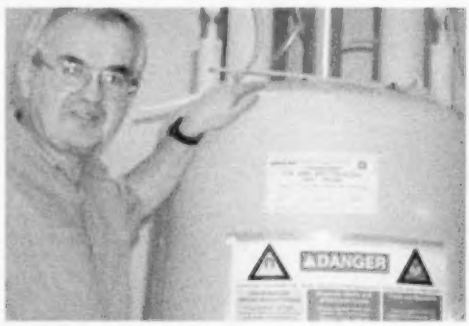
Infrastructure funds provided by ASRIP and other sources, such as the Natural Sciences and Engineering Research Council, have allowed Dr. Wasylishen and his team to install a high-powered, state-of-the-art (500 megahertz) nuclear magnetic resonance facility. The NMR will allow scientists to probe the most basic building blocks of molecules. What researchers learn from such probing is endless, with applications ranging from investigating alternative fuel sources to designing new drugs to improving agricultural technology.

Funds were requested to: i) purchase a laser which will enable Dr. Wasylishen's team to produce hyperpolarized xenon-129 for NMR studies, and ii) purchase a micro-imaging accessory for MRI experiments on solids. This equipment allows them to explore new avenues of research by providing two powerful techniques for characterizing materials. There are many important benefits to having the equipment mentioned above. The six graduate students in the research group are learning state-of-the-art NMR imaging techniques, how to use lasers to create hyperpolarized xenon-129 and most importantly, they are able to perform experiments that were beyond the laboratory's reach a year ago.

A diode laser was purchased and the apparatus required for producing hyperpolarized xenon-129 was assembled. Several research projects are in progress and some preliminary results were presented in an invited talk at recent international conference, XEMA T, Xenon NMR in Materials Science in Nice, France. The laboratory is one of a handful of labs in the world carrying out these experiments; however the situation is changing rapidly. It is foreseen that hyperpolarized xenon- 129 NMR will be used routinely in medical imaging as well as materials science.

The NMR micro-imaging accessory was installed and the team has focused on learning how to use the equipment. A NMR applications specialist from Bruker Germany will provide extensive training. The team will use hydrogen imaging to study fuel cells and eventually, will build a probe that can be use for hyperpolarized xenon-129 NMR imaging. Because of the tremendous enhancement in signal-to-noise many applications can be envisioned and several collaborative projects are planned.

"The new equipment will allow researchers at the U of A to answer many long-standing questions and explore many new avenues of research," says Wasylishen. "The equipment is also essential for the training of the next generation of scientists as we enter this century of new materials."



Dr. Rod Wasylishen with one of his NMR magnets

The Institution:	*The University of Alberta*
Lead Scientist:	*Dr. Rod Wasylishen*
Funding Partners:	*Natural Sciences and Engineering Research Council*
ASRA Funding:	*$650,000*
Total Project Cost:	*$1,452,373*

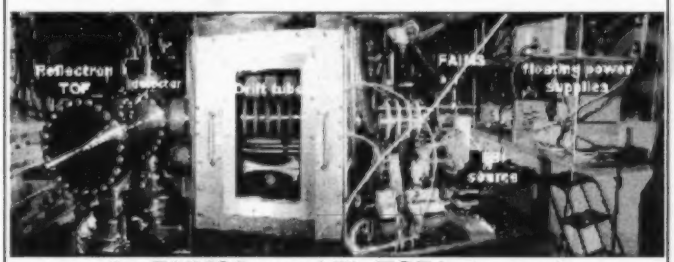
URSI-01-039 ***'Electrospray Ionization - high field asymmetric waveform ion mobility spectrometry- tandem mass spectrometry (ESI-FAIMS-MS/MS)'***

ASRIP funds were used to acquire the FAIMS unit in combination with a Sciex Q Star MS-MS-TOF to create a unique research capability. The unit separates individual compounds within complex chemical mixtures on a different basis than chromatography, the most common instrumental interface for a mass spectrometer. This separation capability can function with molecules that are too large or polar for separation with a gas chromatography interface and it offers the advantage of providing a continual stream of separated ions into the mass spectrometer, rather than as a transient peak that occurs with any chromatography interface. Finally, it can also separate compound mixtures that chromatography cannot resolve.

ESI-FAIMS combined with quadropole, time of flight and tandem mass spectrometry provides a unique remarkably powerful analytical capability for Alberta's oilsands industry. A by-product of extracting oil from the oilsands, naphthenic acids (NA) represent a limiting constraint on wastewater management in northern Alberta. NAs have historically been recognized as a source of corrosion by the petroleum industry, but over the past decade they have attracted growing environmental concern with the realization that they represent the primary source of toxicity in process-affected waters from the oil sands industry. The new equipment provides detailed analysis of the structure of NA, better than any other analytical methods previously used. Such capabilities are critical to tracking the source of toxicity in the mixture of wastewater compounds. It will allow the oilsands industry to target its treatment technologies to remove the toxic compounds from the wastewater before it is released into the environment.

The FAIMS technology is now being marketed by a National Research Council spin-off company, Ionalytics, who have partnered with this facility to demonstrate the capability of this technology.

This infrastructure is unique in the world and has given the Environmental Health Sciences laboratory in the Department of Public Health Sciences a matchless capability for academic research. In total, 14 graduate students and post-doctoral fellows have benefited from the infrastructure and six highly qualified personnel were recruited by the availability of the equipment. Trainees on this technology have developed unique skills that are in increasing demand, including the experience with electro spray ionization mass spectrometry. This expertise is in high demand within industries such as pharmaceutical research.



the FAIMS/ion mobility/TOF instrument

The Institution: *The University of Alberta*

Lead Scientist: *Dr. Ken Froese*

Funding Partners: *Canada Foundation for Innovation, Alberta Health & Wellness, Alberta Heritage Foundation for Medical Research*

ASRA Funding: *$197,614*

Total Project Cost: *$497,083*

S&R 01406-004-02 ***'Global Communications Centre of Applied Technology'***

The infrastructure for the Global Communications Centre (GCC) is now established on the third floor of the ICT wing of the new Heart Building on the SAIT campus. This centre consists of four fully equipped PC laboratories, a PC technical lab, a lecture room, a project room, a presentation room, a research lab, and other rooms. The centre is fully networked with four networks available in each laboratory, two internal for projects and two connected to the SAIT intranet and the Internet. The research facility, established with the ASRA grant, will provide a new opportunity for cost effective applied research that delivers quick and tangible results.

Student technology projects are ongoing, some of the recent projects include:
- Wireless downloading of MP3 files from a home unit to a player unit in a motor vehicle
- Developing a radio frequency USB controlled servo-motor
- Developing a wireless home alert system to warn home owners when an intrusion or fire occurs
- Building various robots
- Designing and developing remote monitoring systems for power companies to monitor power usage
- Building a wireless sound system using "BlueTooth" technology
- Developing miniature voice-activated receivers that would react to a call and respond by beeping or flashing and that could be attached to things that are commonly misplaced
- A heart rate and respiratory monitor that triggers alarms when an anomaly is detected in a babies vital signs

Cisco Systems Canada has agreed to provide an endowment that will amount to approximately $2 million, the proceeds of which will be used to fund an Applied Research Chair to be housed in the Global Communications Centre. This chair will focus applied research on the effective use of technology in the delivery of technical education. SAIT is currently the Cisco Authorized Training Centre for Western Canada and provides the Train-the-Trainer program for Cisco Regional Academies on both the Cisco Certified Network Associate and Cisco Certified Network Professional level.

Another partnership that has recently been approved is with Microsoft. Now established as a Microsoft Certified Technical Education Centre, SAIT will be able to provide industry with high-level official Microsoft programs.

An applied research project was carried out through the SAIT Innovation Office for Prologic Controls Inc. This project related to developing a system to automatically and remotely test and charge sets of batteries for field operations without any disruption to the service. This complicated electronics and electrical application required the designing, building and testing of a prototype. The project was successful and the company is in the process of commercializing the results. The researcher was recognized by receiving the SAIT Innovation Award for Technical Implementation.

The launch of the Alberta SuperNet will also open opportunities for further research on the impact that this greater accessibility to the Internet will have on education. SAIT has recently been instrumental in the establishment of the eCampus Alberta initiative, a consortium of 14 colleges across Alberta specifically for the collaborative development and delivery of distance education programs on-line. The challenge will be to make this collaboration as effective as possible. The GCC will be the major research facility in support of this initiative.

The Centre has also been extensively utilized for intensive training courses for career changers. These candidates are typically 34 years of age and undergo twelve months of postgraduate, high-level IT training. Approximately 120 students per year pass through the centre and this training is ongoing.

The Institution: *Southern Alberta Institite of Technology (SAIT)*

Lead Scientist: *Dr. Gordon Nixon, V.P. Academic*

Funding Partners: *Cisco Systems Canada, Global Communications Ltd.*

ASRA Funding: *$2,500,000*

Total Project Cost: *$25,500,000*

S&R 99-41 ***'The New Media Institute Human Centered Interface Design Project'***

The primary focus of The Human Centered Interface Project (HCIP) infrastructure initiative has been the visualization laboratory. This laboratory is located in the basement computer laboratory. It has been renovated and a three-screen immersive visualization suite was created. Unlike other facilities, staff are able to reconfigure the screens to enable presentation research into qualities of immersion and the related facilities. Along with web server access, they are also able to run other video components in the laboratory. The Centre has provided a high-end audio environment that allows ongoing research into the navigation and aesthetic value of audio in 3D immersive spaces. The laboratory is configured to allow researchers, observers and audiences, as appropriate, to be comfortable within this space. These facilities provide the ideal environment for The Banff Centre to continue current research endeavours and build heightened partnerships. Workstudies and researchers in training participated in the planning and implementation of the laboratory. It provided an important opportunity for technical staff to update their skills. Industrial, research and software partnerships (with Alias/Wavefront, the National Research Council, and Compaq) provided opportunities for The Banff Centre to lever excellent prices and resources for the laboratories.

The Human Centered Interface Project built our visualization laboratory and staff are currently implementing the second, linked laboratory, for collaborative research. This laboratory provides a fundamental and valuable asset for The Banff New Media Institute, one that enables research into cross-disciplinary visualization. It includes three-dimensional computer graphics capacity, motion tracking and a wide range of navigation and projection possibilities. The goal is to build a laboratory with compatibility to other labs in the network but with special features that would attract researchers in residency and allow the team to pursue presentation research.

New research initiatives are underway with additional partners that continue an emphasis on human centered interface design, enhancing the social and cultural drivers for innovation, and a pathway between research, applied research, development and technology transfer. The centre has built a strategic alliance with the WestGrid project, and participated on the visualization and collaboration steering committee. The Centre has also successfully created a strategic partnership with TRLabs, and initiated a researcher in residency program that they are developing with the National Research Council (NRC). The Centre is currently developing a physical-computing laboratory that will be a strong addition to their ongoing capacity to engage in human centered interface research. The team continues to work closely with other Alberta institutions such as the Alberta College of Art and Design whose themes correspond with current Banff Centre research priorities (collaboration, visualization, convergent content including broadband and wireless, cross-disciplinary methods and management, new media in context, and transparent interfaces).

Their commercial partnerships continue with broadcasters and Electronic Arts. The Centre has a new partnership with Intel and are in discussions with SGI, Corel and Microsoft.

People interacting with the immersive visualization suite.

The Institution:	*Banff Centre*
Lead Scientist:	*Sara Diamond*
Funding Partners:	*Social Sciences and Humanities Research Council, Informatics Circle of Research Excellence*
ASRA Funding:	*$600,000*
Total Project Cost:	*$7,717,500*

IIPP 300-10-1-11 ***'Institute of Biomolecular Design (IBD)'***

Researchers at IBD have begun groundbreaking work to develop a virtual cell, a micro-organism that lives only in cyberspace, to cut health care costs, speed the development of new drugs and test new treatments. IBD scientists are creating a simulation of an *E.Coli* cell with the goal of developing the knowledge and technology to simulate more complex living organisms.

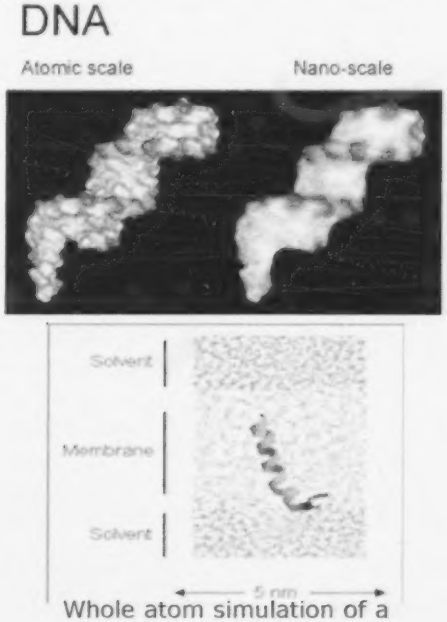
Through the IBD and its central research focus, Project CyberCell, the University of Alberta has secured over $22 million in scientific infrastructure. The project has established the largest functioning platform for proteomics research in Western Canada and the most accessible in the nation. It has also played a major role in integrating research activity across faculties and has proven an invaluable source for faculty recruitment and retention. Furthermore, the escalating international profile of CyberCell stands to showcase UofA's research excellence for at least a decade.

The IBD has been able to establish the largest, most effective and most accessible proteomics platform outside of Toronto. This facility has now processed over 7,000 samples for institutions across Canada including McGill, McMaster, Simon Fraser, U.B.C. and Calgary, often with 3- day turn-around on analysis. The key to our success to date lies in the synergistic relationship that exists between service and science. Our technical and administrative staff performs double duty on CyberCell and services. This arrangement provides the immediate incentive to stay abreast of new technology which is then transferred to its service component.

With the largest functioning platform for proteomics research in Western Canada, the IBD has proved to be an invaluable resource for faculty recruitment and retention. It also plays a major role in integrating research activity across faculties. The key disciplines affected have been in the Faculties of Medicine and Science. An estimated 48 graduate students/postdoctoral fellows have received training on the equipment, and they have also gained valuable knowledge from the technicians in the facility.

Through the collaborations that have emerged from the Proteome Analysis Core Facility, IBD researchers have developed a range of experimental approaches and formed a number of key partnerships. The result is a research environment that maximizes the rate at which scientific discoveries are made and the ability to link these findings, capitalize on discoveries quickly, and facilitate the transfer from basic research to medical advances that make important contributions to society as a whole.

The IBD collaborates with the Universities of Calgary and Lethbridge for proteomics research. Also, IBD contributes to Alberta's biotechnology industry by providing services in proteomics. Smaller biotech companies welcome the opportunity to utilize the facility, thus saving themselves the cost of purchasing and maintaining equipment. IBD technicians provide their expertise in designing experimental approaches and in advice on streamlining procedures and troubleshooting problems.



Whole atom simulation of a peptide inserting and orienting itself within a membrane.

The Institution:	*University of Alberta*
Lead Scientist:	*Dr. Michael Ellison*
Funding Partners:	*Canada Foundation for Innovation, Alberta Heritage Foundation for Medical Research*
ASRA Funding:	*$3,900,000*
Total Project Cost:	*$19,872,956*

URSI-01-159 & URSI - 02-048 **'Molecular Biology Infrastructure - Tissue Culture and Bioreactor Facilities for BioMedical and BioChemical Engineering Research'**

Drs. Behie and Kallos are the world's first researchers to sucessfully expand neural, or brain stem cells in a computer-controlled bioreactor. This important break-through could lead to transplanting stem cells into the brain to help cure Alzheimers and Parkinson's disease.

The infrastructure has shown long-term benefits as well as several short-term successes. Because the Biochemical Engineering field is an emerging area with applications in healthcare, pharmaceuticals and tissue engineering, the infrastructure has allowed for advances in a cross section of these areas. One example of a socially relevant, and potentially profitable, project is the neural stem cell project. Neurodegenerative disorders, such as Parkinson's disease, Alzheimer's, and multiple sclerosis account for billions of dollars a year in costs to our healthcare system, as well as affecting millions of people in North America alone. These diseases are treated (vs. cured) at considerable cost, while the transplantation of neural tissue derived from neural stem cells could potentially offer a cure that could save lives. This would represent a dramatic improvement in the quality of life for many individuals around the globe. Researchers anticipate working with a Canadian biotechnology company to begin to commercialize the technology developed in this area within the next two years. As more research is conducted and highly qualified personnel are trained at the facility, the University will initiate start-up companies to take the research to the next level.

On-going projects which have directly benefited from these infrastructure grants include the development of bioreactor protocols for the expansion of mammalian stem cells, and the production of human therapeutic proteins from their newly patented, gene expression system. Specifically, the biosafety laminar flow hood, cell culture incubator, cryogenic storage facility, and fluorescence microscope have allowed advances in stem cell research at the U of C. The microscope has allowed researchers to determine growth patterns of cells in culture, study and characterize neural stem cells at the subcellular level, and elucidate differentiation mechanisms employed by the stem cells to produce fully functional cell types. These studies have been initiated in new 1L and 3L computer controlled bioreactors. There are also shorter-term benefits which have been realized from the building of this infrastructure. Very recently, talks have been initiated with an international company to commercialize the medium of the neural stem cell project. This will undoubtedly lead to economic benefits to Alberta. As the field of neural stem cell research grows, the demand for media and reagents will grow as well. The development of new media and bioreactor protocols for growing neural stem cells would not be possible without this new infrastructure. Through great advances in research over the past year, they have placed both U.S and Canadian patent applications. The new infrastructure acquired has allowed the laboratory to perform cutting-edge research which will ultimately benefit other researchers internationally.

The Pharmaceutical Production Research Facility (PPRF), formed with the help of this funding, has enabled many different long-term projects to be carried out under one roof. The extensive scale-up capabilities and added analytical equipment have made this a superior bioengineering facility and have created a great opportunity for Canada to become a leader in BioMedical and BioChemical Engineering Research. This infrastructure has also complemented the existing BioMedical Engineering Program and has encouraged more collaboration with faculty members from the Faculties of Engineering, Medicine and Kinesiology.

One 1.0 L Computer-controlled Bioreactor Station

The Institution: *The University of Calgary*

Lead Scientist: *Dr. Leo Behie and Dr. Michael Kallos*

Funding Partners: *Canada Foundation for Innovation, Alberta Heritage Foundation for Medical Research*

ASRA Funding: *$407,232*

Total Project Cost: *$908,566*

URSI-01-061 '***Electronic Data Infrastructure Upgrade'***

The upgraded electronic data infrastructure at the Department of Chemistry comprises the Departmental network hardware (used in the transmission of research data and access to the infrastructure from remote computers within the Department), a super-computational cluster (used in computational and theoretical chemistry), computer and network security hardware, and Departmental servers (storage and publication of research results and data). The network upgrade has benefited all research groups in the Department, as have the server and security upgrades. Research performed on this infrastructure has been published in peer-reviewed journals. These researchers have also participated in projects that have received popular press attention (i.e., Edmonton Journal).

Several research projects involving collaborative computational aspects between groups in different disciplines are now in place. For example, Prof. PN Roy (computational chemist) and his group are collaborating with Prof. Bundle (organic/glycobiology) of the Alberta Ingenuity Centre for Carbohydrate Science on a project studying the specificity of protein/ligand interactions. Also, many of the groups using the Departmental facilities either cannot afford a private cluster or could not make efficient use of an entire private cluster, making the availability of a Departmental facility important to those groups with computational requirements on an occasional or a low-capacity basis.

This project employs cost-sensitive applications of one of Alberta's strategic research priorities, Information and Communications Technology (ICT), in support of chemistry research under the umbrella of another strategic priority, Life Sciences. Many of the researchers are involved in several of Alberta's research priorities; the Alberta Ingenuity Centre for Carbohydrate Science, the Alberta Synchrotron Institute, and the National Institute for Nanotechnology. All of the chemistry researchers associated with each of these centres or institutes use the upgraded infrastructure daily, and the computer and network security aspects of this project keep their data and ICT hardware secure from intrusion.

The University of Alberta has been recognized as a site with significant numbers of people with computational cluster expertise. The administrator of the infrastructure, has regular interactions with researchers and other systems administrators. His expertise has been solicited by other organizations both on campus and outside the University on the planning, development, installation, and maintenance of related research facilities.

The electronic data infrastructure upgrade, along with the cluster facility, helped attract new faculty and graduate students to Alberta, and provides on-going support for their research ambitions and efforts. In total, 14 graduate students and post-doctoral fellows were recruited or retained by the availability of the equipment and 200 trainees per year accessed the upgraded infrastructure.

Dr. Gary Horlick

The Institution:	*The University of Alberta*
Lead Scientist:	*Dr. Gary Horlick*
Funding Partners:	*University of Alberta, Enterasys Inc.*
ASRA Funding:	*$200,000*
Total Project Cost:	*$442,867*

S&R 99-29 ***'Infrastructure for Shallow Geophysical Studies'***

All of the equipment has now been purchased and used in a number of differing surveys. Staff have initiated numerous collaborations and are currently seeking funding from NSERC to fund a Major Facilities Access grant to make this equipment readily available to academic researchers for field studies in Alberta and Canada.

a) Seismic Acquisition System and Minivibrator Truck: This system has been very busy. Since the equipment was obtained the vibrator truck has been used 7 times at our time lapse site over a Lloydminster reservoir, once at an Athabasca basin uranium mine, for time lapse and permafrost imaging at the edge of the Beaufort Sea in the NWT, 3 times to study a Sweetgrass igneous dike in Southern Alberta in conjunction with the U of Alberta field school, and once at Fort McMurray for testing at the Dover SAGD site.

b) The magnetometer system has been used extensively in surveys over the Sweetgrass Dykes in Southern Alberta. As well the equipment has been used to study volcanic outcrops in Alaska and California.

c) The ground penetrating radar system has acquired data to study river deposits in detail along the Milk River in Southern Alberta. It is anticipated that a large project will employ the equipment to study peat bog volumes in Northern Alberta for purposes of calibration. Dr. Sacchi has also used the GPR system to obtain data that is useful for testing of processing procedures.

d) The resistivity system was the last piece of equipment purchased. Staff have tested it in our Geophysical Field School in Southern Alberta and at the Wagner Bog Natural Area. They are currently looking for a student to carry out extensive studies of the ground resistivity that can be tied to a number of shallow water wells at the Wagner Bog area, in collaboration with the hydrology groups in Earth & Atmospheric Science at the University.

e) The differential GPS system has been used in nearly all of the seismic surveys to obtain accurate positions on shots and receivers, this tool has greatly expanded our capabilities to repeat seismic surveys successfully.

The impact on Dr. Schmitt's program alone has been tremendous. Staff can carry out field experiments that were impossible previously - or at prohibitive cost using industrial support. They have been able to carry out very careful time lapse experiments that no one else has attempted. As well, staff conducted interesting studies of permafrost that may reveal its structure to a wide audience. This work will be submitted to the publication Nature.

This equipment has been highly beneficial to undergraduate and graduate training. Students actually get to participate in data acquisition - particularly for seismic data - whereas before they were dependent on donations of data from industry. Further, this equipment has opened up a great deal of opportunities that otherwise would have been on the sidelines for (e.g. time lapse seismic monitoring, gas hydrate investigations). The work is highly collaborative and interdisciplinary - they are now nearly oversubscribed in what they can likely carry out -and collaborations have been formed with the usual engineers (petroleum, civil, mining) and geohydrologists; and expanded to include fish and forestry biologists. As such, this equipment is giving students a very wide exposure to geophysics as a whole. In total, five graduate students, three post-doctoral fellows and one research associate have benefited from the infrastructure. Four of the graduates have been employed by Alberta's oil industries.

The equipment has likely put the geophysics group at the University of Alberta into one of the strongest positions anywhere. Dr. Schmitt expects this equipment will help us in attracting both new faculty and it is already assisting in increased funding and research opportunities both locally and globally. Perhaps most importantly, the U of Alberta undergraduate and graduate students are able to get real, hands on experience in the field, further strengthening our programs.

Truck mounted seismic vibrator (IVI Minivibe)

Ashtec Differential GPS System

The Institution: *University of Alberta*

Lead Scientist: *Dr. Doug Schmitt*

Funding Partners: *Natural Sciences & Engineering Research Council, Seismic Heavy Oil Consortium, AOSTRA*

ASRA Funding: *$776,000*

Total Project Cost: *$1,836,000*

S&R 01406-004-13 & IIPP 300-10-1-27

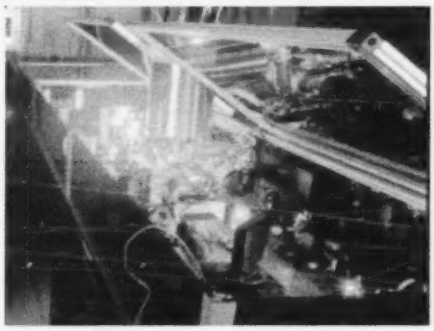
'Laboratory for Laser and Spectroscopic Applications in the Natural Resource Industries'

The project was implemented in support of the Industrial Research Chair on Laser and Spectroscopic Techniques Applied to the Natural Resources Industries. In addition, new activity has been supported by the infrastructure in the area of laser micromachining funded under the Canadian Institute for Photonic Innovations (CIPI) NCE on photonics. This new research work investigates the drilling of 3D channels in glass for fabrication of 3D micro fluidic chips, nanomilling of surfaces for fine finishing of nanostructures and a detailed study of the ablation of silicon and residual damage for applications in Micro-Electro-Mechanical Systems (MEMS) and microelectronic devices.

The laser facility infrastructure provided by ASRA has aided in the establishment of new research projects in laser sensors, laser micromachining, terahertz electro magnetics and ultrafast x-ray sources for medical and scientific applications. The laser facility is set up in the new Electrical and Computer Engineering Research Facility building at the University of Alberta. The infrastructure has been instrumental in supporting an Industrial Research Chair program sponsored by MPB Technologies and NSERC. Much of the research work on the development of laser sensors would not be possible without the facility. The infrastructure also has been critical in establishing participation in the Canadian Institute for Photonic Innovations, a Network of Centres of Excellence. Based on the ability to carry out research in ultrashort pulse micromachining using the new infrastructure, Prof. Fedosejevs became project leader of the laser micro machining project, leader of all research on materials and devices, and now is the Scientific Director of the CIPI Network. It has thus raised the profile of the University of Alberta in Canada in the photonics area. The CIPI projects stress collaborations between researchers at different Universities and has lead to collaborations with researchers at the University of Toronto and the University of Laval in laser micromachining for microfluidic and telecommunications applications. Future work in these collaborations will focus on micromachining sub-micron scale size features for applications in nanotechnology.

In total, 20 peer reviewed publications, 7 invited talks and 16 conference presentations have been made based on work from the funded infrastructure. In addition, one patent and three additional reports of invention have been filed on research work from the ASRA funded infrastructure. The primary area of research, applications to the Natural Resources Industry, is a priority area for the University and the province. Information and communications technology is another priority area for the University in which the leading edge research on the generation and application of terahertz radiation will have a future impact on ultrahigh frequency and ultra wide bandwidth communication channels of the future. The applications in micromachining are focused on the areas of microfluidics and nanotechnology which are new priority areas of the University.

The infrastructure strengthens Alberta's ability to be a world leader in the development of advanced laser based technology in traditional areas of natural resources and manufacturing and in emerging areas of nanotechnology and telecommunications.



A state-of-the-art femtosecond laser amplifier system (NSF Image Library)

A scanning electron microscope image reveals the word "Lauranne" etched onto a strand of human hair (NSF Image Library)

The Institution: *University of Alberta*

Lead Scientist: *Dr. Robert Fedosejevs*

Funding Partners: *Natural Sciences & Engineering Research Council, Canadian Institute for Photonic Innovations*

ASRA Funding: *$691,909*

Total Project Cost: *$3,542,818*

IIPP 300-10-1-8 ***'Modern Infrastructure for Advanced Capabilities in Molecular Biology and Biotechnology'***

This project, addressed urgent priorities in three related areas. The first involved creation of a centralized molecular biology service unit built around a trio of DNA sequencing machines, DNA synthesis capability, high performance thermocyclers, and equipment required for sample preparation and processing, data analysis, and genetic transformation. The second involved acquisition of new technologies in digital imaging, including multiphoton confocal microscopy and environmental scanning microscopy. The third involved modernization of our controlled environment facilities in the Department of Biological Sciences. These new technologies have had a significant impact on our ability to attract outstanding scientists and students.

The infrastructure that Dr. Taylor has put in place as a result of funding from ASRA, CFI and other partners has had a significant effect on their research capability. It has become a major part of their effort to recruit new faculty. In virtually every one of the department's academic recruitment competitions, the quality of the infrastructure has been a source of excitement. Given the number of academic positions we have recruited in the past year, and will be recruiting in the coming months, this has been an important asset for our department. An important outcome is reflected in the success we have had in attracting our top ranked candidates to the University of Alberta. The faculty has not been as active in recruiting professional and technical staff in the past year, so the impact here has been less. Nonetheless, the infrastructure has been a source of pride for those who work in the relevant units. Most importantly, the infrastructure has enabled faculty to engage in research where they play a role as technology centres in multidisciplinary collaborations. They are seeing evidence that the infrastructure will spawn a number of collaborations within and beyond the department in the years to come.

It is difficult to provide a direct measure of research productivity that arises from this infrastructure. The controlled environment facilities are used by as many as 40 academic staff. The molecular biology service unit provides a resource to 25-30 different academic staff. The microscopy unit is used by approximately 15 academic staff. The PDFs and students who work with these professors increase utilization of the infrastructure. In a typical year, upwards of 200 papers are published by faculty, students, and staff in our department. As many as 75% of these will make use of this infrastructure. Operation of the infrastructure would not have been possible at the level of an individual investigator, since costs would have been prohibitive. All indications are that the infrastructure is providing new collaborative opportunities.

By providing department staff and students with state of the art infrastructure, we are developing a learning environment that is well suited to training the next generation of highly qualified personnel. This is particularly important in the biotechnology sector, where demand for highly trained people is high, and where the university's ability to meet that demand will affect Canada's ability to compete in a global market. The extent to which the infrastructure is supporting new collaborative efforts at the interface between traditional disciplines also support training of HQP.

Research supported by the new infrastructure has the potential to provide health, social, and environmental impacts. It also has the potential to lead to development of new intellectual property. Insofar as university researchers, spin-off companies, and government laboratories are using the infrastructure, these benefits will be realized in a variety of different ways.

Dr. Gregory Taylor, dean of the Faculty of Science

The Institution: *University of Alberta*

Lead Scientist: *Dr. Gregory Taylor*

Funding Partners: *Canada Foundation for Innovation, Alberta Heritage Foundation for Medical Research, Natural Sciences & Engineering Research Council*

ASRA Funding: *$1,305,690*

Total Project Cost: *$3,636,387*

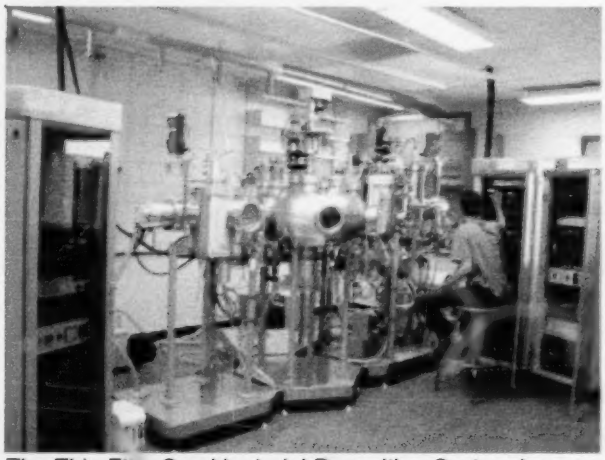
URSI-01-060 '**Infrastructure for Deposition and Characterization of Combinatorial Arrays of Thin-Film Inorganic Compounds and Opto-electronic Devices'**

Funds were provided to support the design and synthesis of nanostructured materials and devices and the use of combinatorial methods to efficiently discover new materials and solar cells. An ultrahigh vacuum combinatorial deposition system and instrumentation for characterization of these libraries of optoelectronic devices was installed. This facility will enable the preparation of combinatorial libraries for exploration of composition-space to discover new solid state compounds; exploration of thin film heterojunction diode architectures to discover new, cost-effective solar cells based on abundant, non-toxic, and inexpensive elements; and the exploration of composition and superlattice structure to enable an improved understanding of magnetization dynamics.

A combinatorial approach will be used to discover and optimize new types of thin-film solar cells that will be cost effective for terrestrial energy production. Existing solar cells have been discovered and improved over decades by a combination of serendipity, intuition, and rational design. This is because the interactions between all of the materials, interfaces, defects, dopants, and impurities are too complex to allow for accurate predictions of real solar cell efficiencies. The combinatorial approach enables rapid screening of a large number of combinations of materials and dopants to discover promising new devices. Solar cells will be produced using the promising lead architectures and the efficiency and operative mechanisms quantitatively determined. Ultimately, by intensively studying the efficient new devices discovered using combinatorial methods, these complex systems will become better understood and amenable to rational design.

The availability of this research infrastructure has enabled Dr. Faber to attract excellent graduate students from the University of Alberta, France (undergraduate at the Ecole Nationale Superieure Chimie Montpellier), and Columbia (Universidad Industrial de Santander). Because these students are completing their first year, they have had limited time for research activities. As they progress, Dr. Faber expects that other research output will be significant, enabling them to attract sufficient operating funding to maintain the infrastructure.

Similarly, several interdisciplinary research collaborations remain underdeveloped due to a lack of experienced research personnel. As the program develops, qualified researchers will begin to work on interdisciplinary collaborative projects with Mark Freeman in physics and Steve Dew in electrical engineering.



The Thin Film Combinatorial Deposition System became fully functional in August 2002

The Institution: *The University of Alberta*

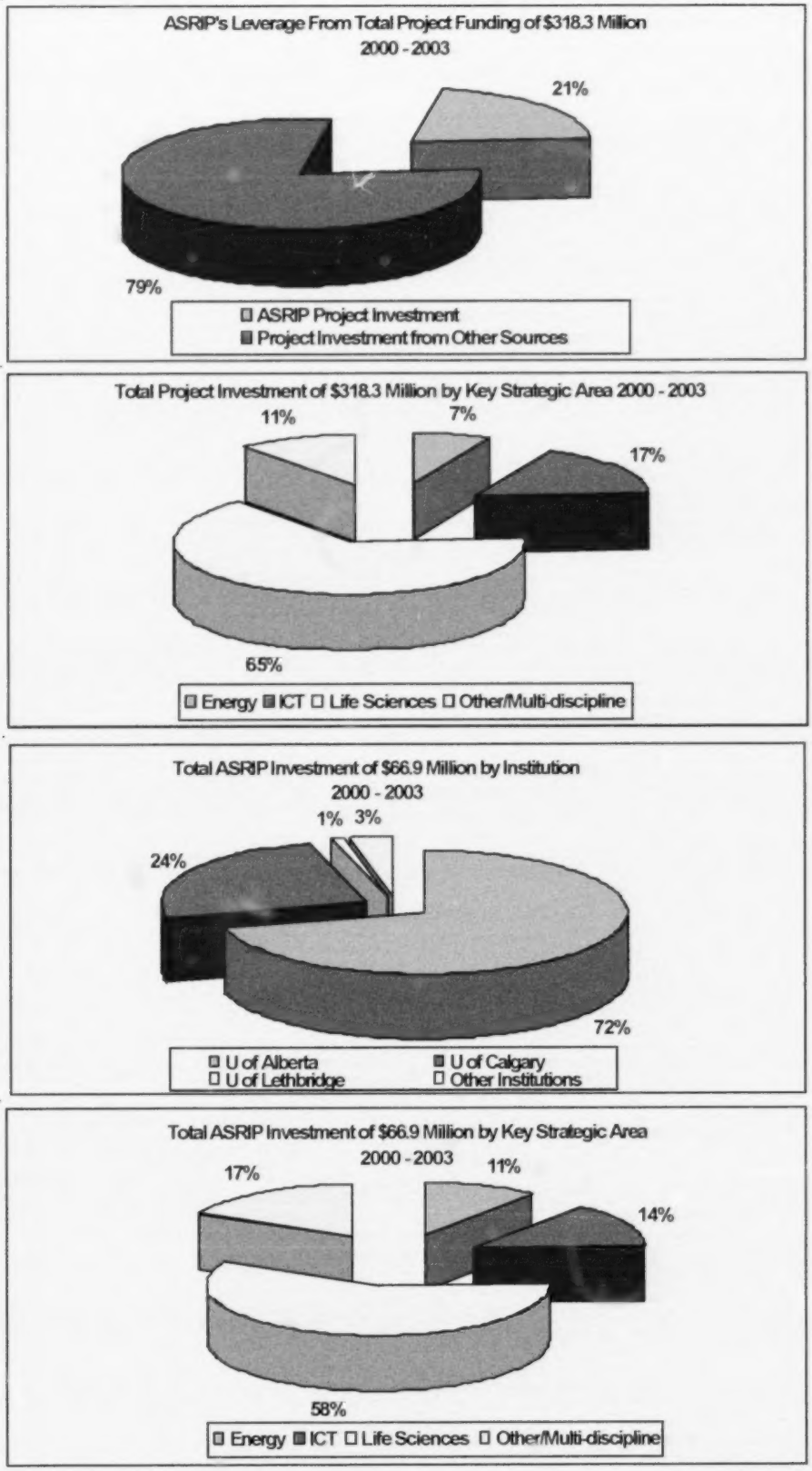
Lead Scientist: *Dr. Joel A. Faber*

Funding Partners: *Canada Foundation for Innovation, University of Alberta*

ASRA Funding: *$540,000*

Total Project Cost: *$1,288,622*

Figure 1
ASRIP's Strategic Investments - Research Capacity in Key Strategic Areas



The Program

The Alberta Science Research and Investments Program was announced in early 2000, and was an amalgamation of the earlier Intellectual Infrastructure Partnership Program and the Science and Research Fund. ASRIP supports research through three distinct funding streams:

1. **Research Infrastructure**
   Invests in strategic research infrastructure at Alberta's universities in order to:

   - increase research excellence and competitiveness of Alberta universities and research hospitals;
   - help Alberta universities attract and retain highly qualified faculty and graduate students;
   - encourage the development of institutional and collaborative centres of excellence; and
   - leverage funding from private and public partners, and assist universities and research hospitals in accessing research infrastructure funding from the Canada Foundation for Innovation.

2. **Enabling Research Application and Technology Transfer**
   Supports linkages, infrastructure, and networks that are directly related to research application and technology transfer in order to:

   - enhance Alberta's capacity to capitalize on the benefits of research;
   - help build a coherent technology commercialization network; and
   - strengthen partnerships between research organizations and industry.

3. **Science Awareness and Promotion**
   Supports innovative science awareness and promotion initiatives in order to:

   - promote a better understanding and appreciation of the value of science and technology to the social and economic well-being of Alberta;
   - encourage initiatives and research that will improve the ability, methodology, environment, or resources to promote science awareness and science literacy;
   - encourage lifelong awareness and involvement in science;
   - increase the number and level of highly qualified personnel in science and research-based activities; and
   - encourage the innovative dissemination of science information.

Like the programs previously funded by ASRA, the Alberta Science and Research Investments Program is intended to promote quality, foster innovation, and support initiatives that will be of strategic benefit to Alberta within the context of the larger research community, nationally and internationally.

The ASRIP streams have three main objectives in common:

- supporting quality and research excellence
- building the capacity for innovation
- promoting initiatives of strategic benefit to Alberta within a broader context.

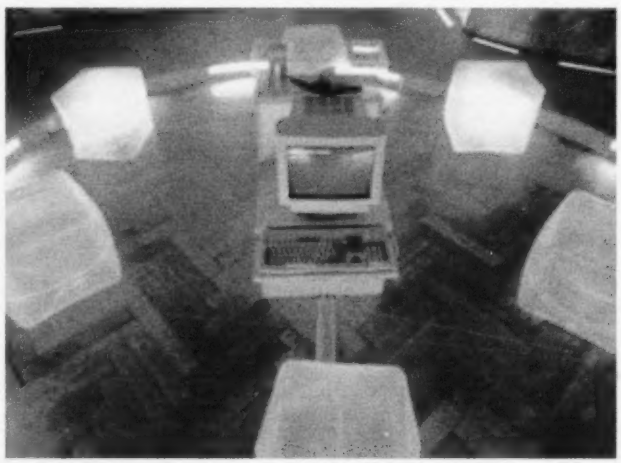
Proposals undergo an external peer review by leading scientists from around the world and are also reviewed by individual members of the ASRIP Scientific Review Panel. ASRIP Panel recommendations are brought to the Finance and Investment Committee of ASRA, which makes recommendations to the Minister of INNSCI on which proposals to support.

The Alberta Science and Research Investments Program ran two competitions between 2000 and 2003. In that time, the program has significantly contributed to the Innovation and Science business plan strategy "to provide strategically targeted support for Alberta university research infrastructure." ASRIP is the only major program within the Ministry that provides funding for infrastructure and, as such, it is an essential vehicle for universities seeking to upgrade, modernize and expand their infrastructure in order to undertake innovative, leading edge research. The research infrastructure funded through previous competitions has also been instrumental in launching or sustaining research excellence and assisting in recruitment and retention efforts at Alberta universities.

In the first three years, ASRIP invested strongly in Life Sciences ($38.8 million), Information and Communication Technology ($9.3 million), Energy ($7.2 million) and Other/Multi-disciplinary ($11.6 million). Other research areas supported include: climate change/environment, science awareness, engineering and technology commercialization. (Life Sciences includes: agriculture and forestry, biotechnology, and health).

Primarily due to outstanding success at securing CFI co-funding for their research projects, the majority of ASRIP's investment of $66.9 million went to the University of Alberta (72%), followed by the University of Calgary (24%), the University of Lethbridge (1%), and other institutions (3%) (Figure 1).

A listing of all ASRIP projects funded from 2000 to 2003 is detailed in Appendix 1, and earlier projects funded by ASRA from 1997 to 2000 are detailed in Appendix 2.



Appendix 1
Alberta Science and Research Investments Program
Research Infrastructure Stream
Project list 2001-2002

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-151	Creation of a Research Institutes for the Study of Supply Chain Collaboration	An outline supply chain simulation environment within which researchers will engage in collaborative research with the business community. Using broadband technology, the aim is to understand and apply collaboration technology, both within an individual business and business to business.	Athabasca University	$2,423,000	$210,000	Other/ Multi-discipline
01-038	Magnetic Resonance Imaging for the Assessment of Stroke and Other Neurological Disease	MRI techniques will play a critical role in understanding the evolution and treatment of strokes in humans. The goal of our proposal is to acquire the infrastructure needed to facilitate the development of a state-of-the-art MRI stroke research program a the U of A.	University of Alberta	$713,663	$355,000	Life Sciences
01-039	Electrospray Ionisation - High Field Assymmetric Waveform Ion Mobility Spectrometry - Tandem Mass Spectrometry (ESI-FAIMS-MS/MS)	A promising new technique for identification and characterization of polar compounds in complex matrices. The infrastucture will aid human exposure research on disinfection by-products and metabolites, cyanobacterial toxins, gas/oil well flare emissions, and arsenosugars and metabolites in seafoods.	University of Alberta	$494,036	$197,614	Energy
01-041	Solid-State Nuclear Magnetic Resonance Facility	To establish a state-of-the-art NMR facility for the investigation of solid materials. This facility will have a major impact on the research programs of several researchers in the physical sciences area and will serve as an important training ground for graduate students.	University of Alberta	$1,400,000	$650,000	Other/ Multi-discipline
01-045	Bamfield Marine Station - Infrastructure For Studies In Biodiversity and Bio-environmental Fluid Dynamics	Bamfield marine station will utilize infrastructure to support new research activities in the ecosystem time series and biodiversity studies of Barkley Sound, and bio-environmental fluid dynamics.	University of Alberta	$3,046,755	$300,000	Life Sciences
01-047	Understanding Land Cover Through a Strategic Infrastructure Development	The primary outcome of this proposal is the consolidation of infrastructure that enhances our current abilities to process, store and manipulate extremely large imagery and related data, and data sets linked to provincial, national and international initiatives.	University of Alberta	$898,478	$350,000	Life Sciences
01-048	Precision Ranching	Sustainable landscape and animal management systems. New and emerging technologies will be used to study complex spatial and temporal interactions among fauna, flora, climate, soils, topography and human factors and their response to management options.	University of Alberta	$1,137,300	$350,000	Life Sciences

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-049	Meanook Biological Research Station Enhancement Proposal	MBRS is a year round facility supporting critical research efforts to further the efficient and sustainable management of Canada's Boreal Forest. Will expand the research capabilities of MBRS with the addition of a chemical lab and computing facilities housed in a new building.	University of Alberta	$670,000	$287,500	Life Sciences
01-050	Molecular Characterization of Cancer Cell Populations by Single Cell and Living Cell Analysis	Funds for a laser microdissector and robotic microtweezers to isolate/ manipulate cells or subcellular regions. Multi-user laser-assisted technolgies permit correlation of molecular properties with cell fundtion, with morphology and position within a cancer mass, a detailed analysis of fresh human tissue specimens not otherwise possible.	University of Alberta	$1,782,244	$533,000	Life Sciences
01-053	Cardiovascular Ion Channel Gene Therapy Unit (CIGNET)	CIGNET is a core molecular physiology facility dedicated to the study of the role of cardiovascular potassium channels in health and disease. Research will range from molecular biology to whole animal and human physiology. CIGNET will support translational research on common diseases (eg. Sudden death and hypertension).	University of Alberta	$800,000	$320,000	Life Sciences
01-055	Geochemical Analytical Facility	The facility will provide chemical analysis for multidisciplinary research on assessment and remediation of contaminated sites. Users from science and engineering will have access to much less expensive analysis for their research projects allowing increased analytical capability for enhanced data gathering.	University of Alberta	$667,100	$295,000	Energy
01-056	Biotelemetry Analysis System: Infrastructure for Cumulative Effects Assessment	The proposed infrastructure combines new space-based technology with sophisticated statistical computing and modeling to develop a powerful new tool for evaluating the cumulative effects of land-use development on wildlife populations. This new tool can be applied to a host of species and adapted to landscapes worldwide.	University of Alberta	$856,408	$200,000	Life Sciences
01-059	Infrastructure for Surface Mining Research Laboratory	Infrastructure and facilities will achieve excellence in surface mining research and attract highly qualified researchers. They will maintain sustainable research programs to advance knowledge and frontiers in mining engineering, with impact on industry, Alberta and Canada.	University of Alberta	$2,000,000	$660,000	Energy

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-060	Infrastructure for Deposition and Characterization of Combinational Arrays of Thin-Film Inorganic and Opto-Electronic Devices	Construction of a deposition system to define and control the composition and architecture of combinatorial arrays of inorganic thin films and thin film heterojunctions for photovoltaic applications.	University of Alberta	$1,222,275	$540,000	Other/ Multi-discipline
01-061	Electronic Data Infrastructure Upgrade	A major upgrade of the networks, servers, and data security systems within the Department of Chemistry. Enhancements include faster networks, larger and faster servers, security systems designed to ensure data integrity.	University of Alberta	$459,079	$200,000	ICT
01-063	Campus Alberta Research Data Centres	This project is part of network of regional Research Data Centres, which will establish in Libraries at the U of A & U of C Research Data Centres to house secured access to select confidential data files from Statistics Canada.	University of Alberta	$1,370,638	$685,316	ICT
01-066	Network Enabled Smart Robotic Systems	More advantageous deployment of robotics, sensing & network technologies in areas of Community Health, Environment and Resources in Alberta demands the need for a Laboratory focused on advancing new ways of integrating fundamental research in these areas.	University of Alberta	$2,029,683	$300,000	ICT
01-070	Whole Body Calorimetry	This initiative will result in development of a whole body calorimetry room at the U of A dedicated to accurate measurement of energy metabolism in humans. The unit will enable researchers to investigate mechanisms of energy utilization throughout the life cycle and in various disease states.	University of Alberta	$770,000	$350,000	Life Sciences
01-162	Phase I Clinical Trials and Research Unit	Medical unit for in-patient clinical trials and research. Purchase monitoring equipment-central station, network of 16 peripheral physiological monitors, replacement of equipment for processing and storage of blood and samples, and for minor renovations.	University of Alberta and Capital Health Authority	$363,932	$152,500	Life Sciences
01-102	Gene Therapy Initiative the University of Calgary	Recent advances in biotechnology have made it possible to deliver foreign genes into cells for the treatment of human diseases. The purpose of this project is to establish a GLP/GMP facility that will allow researchers to develop gene therapy.	University of Calgary	$2,366,142	$600,000	Life Sciences
01-103	Creation of a Multidisciplinary 3 Dimensional Morphometrics Centre	Infrastructure to create a multi-disciplinary laboratory for 3-D morphometrics. Components include a Micro CT,Reflex microscope and facilities for image analysis. Facilities will be used by researchers across faculties at U of C & U of A.	University of Calgary	$475,970	$235,624	Life Sciences

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-105	Nutrition, Genetics and Human Performance	Newly-equipped labs in Faculty of Kinesiology toward investigation of genetic risk factors and health status of elite athletes. In collaboration with the Faculty of Medicine, we will share core technologies, enhanced recruitment and scientific interaction on this emerging health science.	University of Calgary	$8,527,202	$3,256,247	Life Sciences
01-111	Multicomponent Seismic data Acquisition System	A system for time-lapse monitoring of CO2 injection and other acid gases in depleted hydrocarbon reservoirs and deep aquifers in Alberta. Geological sequestration of CO2 is a viable technology for the reduction of greenhouse gas emissions.	University of Calgary	$3,399,512	$1,160,000	Energy
01-112	Advanced Space Instrument Facility	Develop "Advanced Space Instrument Facility"(ASIF) at the U of C, to support development of advanced space science instruments for scientific micro-satellites and satellites.	University of Calgary	$598,500	$299,000	Other/ Multi-discipline
01-113	Language Research Facility	A facility for psycholinguistic experimentation on 2nd language acquisition in adults and its implications for improvement of technology-enhanced language instruction, for curricular and teacher development, and for general policy issues related to 2nd or heritage languages.	University of Calgary	$1,077,750	$430,000	Other/ Multi-discipline
01-120	Genetics and Developmental Biology Laboratories	Establishment of the Genes and Development Research Group and the construction of a blend of individual labs without walls and specialized research facilities, (eg. microsurgery, viral gene transfer, digital imaging). These facilities, coupled with the outstanding investigators group, will enhance Alberta's efforts in genetic and gene therapy.	University of Calgary	$1,066,900	$190,000	Life Sciences
01-123	Integrated Centre for Advanced Materials Characterization	The acquisition of this instrument will serve to further strengthen our interdisciplinary research in areas such as the development of new solids, thin films, and polymers.	University of Calgary	$1,700,373	$490,000	Other/ Multi-discipline
01-125	Research Capability Upgrade of the Rothney Astrophysical Observatory	Instrument upgrade to remain competitive, train students in cutting edge astronomical instrumentation, observation. Improve infrared imaging through enhanced IR & optical imaging cameras & controllers, spatial resolution through tip/tilt adaptive optics, improved efficiency through automation of telescopes.	University of Calgary	$552,000	$175,000	Other/ Multi-discipline
01-159	Molecular Biology Infrastructure and Cell/Tissue Culture Facilities for Novel BioChemical Engineering Research	Will build on a proven track record in the biotech field and pursue innovative projects in upstream, process and downstream biochem engineering and will serve as a versatile and powerful analytical facility for other researchers.	University of Calgary	$511,400	$255,700	Life Sciences
				$43,380,340	$14,027,501	

Alberta Science and Research Investments Program
Research Infrastructure Stream
Project List 2002-2003

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
02-044	NMR, GC-MS and computational tools to support research programs in chemistry and biochemistry	Will provide core research tools for explaining chemical structures & understanding reaction pathways. Acquisition of spectroscopic, chromatographic, and computational equipment will support six research projects and other collaborations, which include industrial and international scientists.	King's University College	$665,009	$200,000	ICT
02-043	Advanced infrared physics laboratory	Advanced infrared physics laboratory for the development and calibration of radiometers and spectrometers for remote sensing.	University of Lethbridge	$197,500	$79,000	Other/ Multi-discipline
02-080	Canadian Centre for Behavioural Neuroscience	Major equipment items include attachments for 500 MHz NMR to allow in-vitro imaging of rats and mice, electrophysiological equipment and behavioural equipment.	University of Lethbridge	$770,780	$272,429	Life Sciences
02-125	The Banff International Research station for mathematical innovation and discovery (BIRS)	BIRS is a collaborative Canada-US venture to operate an international centre for the mathematical sciences and its applications. Infrastructure is for a computer network and essential renovations to the Banff Centre to provide suitable lecture rooms, meeting space and accommodations.	The Banff Centre	$1,507,778	$500,000	Other/ Multi-discipline
02-058	Nanofabrication Facility	The facility will significantly extend the capabilities of the existing open-access Microfab to that of the best in Canada, and will be housed in a 6000 square foot clean room in the new ECERF Building at the U of Alberta. Enables innovative research in nanobiotechnologies, nanoscience, and nanomaterials in ICT, health, and resource sectors.	University of Alberta	$8,247,533	$3,082,460	Other/ Multi-discipline
02-066	Westgrid: The Western Canada Research Computing Grid	Canada's first comprehensive grid, is an integrated system of high-performance computing facilities, data storage capability, collaborative work sites, high-speed networks, and human resources that together provides a unique shared research infrastructure designed for and by research groups across Alberta and British Columbia.	University of Alberta	$40,571,910	$5,995,420	ICT
02-068	Facility for Study of Effectiveness of Collaborative, Distributed Software Development	To support research on how software can be conceived, developed and maintained collaboratively in distributed locations. Special focus is on heterogeneous development environments, embedded systems,	University of Alberta	$1,654,174	$546,350	ICT

Project Number	Project Title	Descriptive Summary	Institution	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
02-091	Project CyberCell - Proteomics, Metabonomics and Functional Genomics Experimental Component	To quantitatively determine the dynamic and structural nature of cellular processes in *E. coli*, with the ultimate goal of recreating the living cell computationally. This is a joint application for equipment and renovation funds from the Universities of Alberta, Calgary and Lethbridge.	University of Alberta	$17,454,775	$4,700,000	Life Sciences
02-108	Modern Infrastructure to Support Inter-disciplinary Water Chemistry in the 21st Century	Impacts of industrial development on environmental and human health. Included in this are a freshwater biogeochemistry laboratory facility, variety of highly sensitive analytical instruments, and three fully gauged and monitored experimental catchments in boreal plains, foothills, and alpine locations in Alberta.	University of Alberta	$9,630,188	$1,400,000	Life Sciences
02-121	Ion Beam Laboratory for Nanoscale Materials Processing and Patterning	To build an ion beam laboratory to conduct implantation experiments at the University of Alberta. The laboratory will have custom-built equipment specifically designed for our research. It will provide capabilities that are unique in Canada, and, to our knowledge, are not duplicated anywhere in the world.	University of Alberta	$661,853	$199,575	Life Sciences
02-088	Creation of the Alberta Diabetes Research Centre (ADRC)	The establishment of a state-of-the-art multidisciplinary diabetes research facility. This research centre will provide Alberta with the infrastructure and resources needed to maintain and expand its existing diabetes research excellence.	University of Alberta	$39,832,358	$6,000,000	Life Sciences
02-090	Centre of Excellence for Viral Hepatitis Research	A multidisciplinary centre for research in viral hepatitis at the U of A. Funds will build and equip new space (13,250 sq ft) including animal facilities, provide equipment for existing laboratories, expand our tissue bank and establish a node in a national database for viral hepatitis.	University of Alberta	$9,264,007	$2,000,000	Life Sciences
02-098	Integrating Research in Osteoarthritis: From the beside to the bench and back again	A consortium of musculoskeletal investigators from the faculties of Medicine, Engineering, Kinsiology, and Science, will integrate research efforts into osteoarthritis, a degenerative disease affecting >10% of Canadians. Equipment will consolidate 4 facilities and 2 core resources to enable the necessary multidisciplinary, translation research.	University of Calgary	$12,710,038	$1,900,000	Life Sciences
02-093	Broadband Network Reworking in Support of Bioinformatics and Imaging	Higher bandwidth connectivity is required by the Faculty's of Medicine's life sciences researchers, especially those leading the ICT-intensive fields of bioinformatics and imaging, in order to remain	University of Calgary	$2,955,955	$800,000	Life Sciences

Project Number	Project Title	Descriptive Summary	Institution	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
02-100	Centre for mouse genetics, physiological systems and disease	Investigators will use genetic approaches in mice to model and understand normal development and disease in humans. Conduct both high throughput mutation genes and analysis of complex mutant phenotypes, supporting Alberta's important national and international role in Functional Genomics research.	University of Calgary	$14,539,489	$900,000	Life Sciences
02-060	Protective Clothing and Equipment Research Facility	An enhanced flash fire simulation / instrumented mannequin facility, and equipment for fundamental material combustion studies, combined heat / mass / moisture transfer studies and ultra-violet protection research. Modeling of heat and moisture transfer to address both protection and clothing comfort.	University of Alberta	$1,462,301	$537,462	Other/ Multi-discipline
02-062	Centre for Comparative Psycholinguistics	Enable the multifaceted psycholinguistic study of language representation and processing among speakers of indigenous and minority languages. Combine mobile and stationary laboratories, creating a unique platform for the psycholinguistic study of bilingual language processing.	University of Alberta	$743,685	$297,474	Other/ Multi-discipline
02-067	Tailings Research Facility	The Facility comprised of delivery, treatment and deposition modules will carry out research to develop novel and innovative approaches to treating tailings to reduce the environmental impact of the bitumen extraction.	University of Alberta	$2,000,000	$500,000	Energy
02-105	Alberta Centre for Surface Engineering and Science (ACSES)	An integrated facility for surface characterization and modification, supporting interdisciplinary research throughout Alberta. Essential instruments that currently are not available or are not generally accessible within the province will be provided.	University of Alberta	$13,163,230	$4,000,000	Energy
02-069	High-Field MR for Biological Image-Guided Tomotherapy	A high-field (3T) MR system to develop biological tumor targeting for adaptive tomotherapy, and to study the subsequent metabolic and biochemical treatment effects on tumors and healthy tissues.	University of Alberta	$9,776,300	$3,846,000	Life Sciences
02-075	Hybrid Passive-Active Lighting, Ventilation, and Thermal Systems for Commercial and Institutional Buildings	Development of products and related software for low energy building design, including systems for daylighting, hybrid passive-active ventilation, and use of porous media to enhance performance of solar air heaters and other thermal systems.	University of Calgary	$348,000	$139,200	Energy

Project Number	Project Title	Descriptive Summary	Institution	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
02-083	University of Alberta Heart & Stroke Research Centre	The HSRC is a translational human vascular biology research facility for the new Alberta Cardiac Institute. It takes a 'bench-to-bedside' approach to the study of heart attacks and strokes, and houses state-of-the-art cardiovascular imaging tools, basic science core labs, a gene therapy facility and an outcomes research centre.	University of Alberta	$16,613,301	$3,244,910	Life Sciences
02-096	Centre for Advanced Functional Imaging Studies	The development of a Centre that performs molecular imaging. The 9.4 Tesla magnet and a future 10 Tesla magnet will permit innovative, advanced research in the use of MR imaging to investigate disease and therapeutics in animal model systems.	University of Calgary	$23,657,302	$1,800,000	Life Sciences
02-107	The University of Alberta Protein and Gene Discovery Centre	The University of Alberta Protein and Gene Discovery Centre (Prote-Gene) will advance technology and facilitate research in high-throughput chemical genetics, genomics and proteomics. It will be an integrated interdisciplinary facility, highly complementary to existing and proposed genomics and proteomics facilities in Alberta.	University of Alberta	$9,840,289	$1,800,000	Life Sciences
02-109	Alberta Cooperative Conservation Research Unit: Infrastructure for Studies in Conservation Science	The Unit will function as a central 'umbrella' for research innovation including biomonitoring, landscape and population modeling, and application of telemetry, GPS, GIS and DNA fingerprinting to resource management.	University of Alberta	$2,483,826	$320,000	Life Sciences
02-077	Experimental laboratory for internet systems and applications (ELISA)	The project will provide network measurement equipment at the U of Calgary as part of a geographically distributed internet systems testbed shared with the U of Saskatchewan.	University of Calgary	$3,078,704	$605,000	ICT
02-097	Centre for Health and Policy Studies (CHAPS)	CHAPS will improve the health of Albertans and the efficiency of health care delivery in the Province. This innovation brings together core CHAPS disciplines of economics, population health, health policy analysis and health care utilization and involves close collaboration with related disciplines across the whole university.	University of Calgary	$1,656,825	$150,000	Life Sciences
02-124	ICU CaRES Program	The acquisition, cataloguing, and storage of human material necessary for the investigation of biologic mechanisms of disease; and the collection and storage of demographic and physiologic characteristics of patients to accurately describe their clinical disease.	University of Calgary	$2,234,249	$165,000	Life Sciences
02-999	Athabasca University Geophysical Observatory	The geophysical observatory infrastructure consists of instruments, a high capacity data connection to them, and a building to house them.	Athabasca University	$294,200	$115,000	Other/ Multi-discipline
				$248,015,559	$46,995,280	

Alberta Science and Research Investments Program
Science Awareness and Promotion Stream
PROJECT LIST 2001-2003

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-003	Alberta Science & Technology Hotlines - Science Outreach Program	To provide students, educators and the public access to scientific and technological experts. To promote scientific/technological literacy to all ages, encourage scientific and technological endeavors and careers and to excite Albertans with science and technology.	Alberta Science Literacy Association	$1,113,000	$680,000	Other/ Multi-discipline
01-150	Science Outreach-Athabasca	Involve individuals and schools to establish a knowledge bank that considers the abundant natural systems of the Athabasca region. Science awareness and promotion achieved by science camps and info sessions, and conveyed globally by internet and regionally by signs.	Athabasca University	$64,000	$48,000	Other/ Multi-discipline
01-019	Alta: A Very Large Area Time Coincidence Cosmic Ray Telescope	ALTA is a computer connected network of cosmic ray detector systems deployed in Alberta high schools and colleges in a very large area array. Using this and the Global Satellite Positioning System we search for high energy cosmic ray showers.	University of Alberta	$567,400	$300,000	Other/ Multi-discipline
01-072	Alberta Science Email Mentoring Project for Girls: SCIberMentor	The SCIberMENTOR project is an email monitoring program aimed at girls between the ages of 11 and 18. The girls will be matched with University or professional women scientists or engineers for career advice, and encouragement.	University of Calgary	$269,250	$179,250	Other/ Multi-discipline
01-076	Science Awareness on Biotechnology for Albertans	The objective of this project is two-fold: 1)to measure Albertans' awareness and knowledge of, and attitudes towards, biotechnology through a survey and series of focus groups; 2)to promote public understanding of biotec. through a website.	University of Calgary	$338,561	$30,000	Other/ Multi-discipline
02-005	"Ecology Connections:" A website (Kaninaskas Field Station)	Develop a website for high school biology teachers, students, and public in general, that connects primary literature of the science of ecology with ecological concepts present in the Alberta Program of Studies for Biology 20/30.	University of Calgary	$210,100	$99,100	Life Sciences
02-009	Visitors centre at the Rothney Astrophysical Observatory	Extend the RAO's highly successful Open House program by expanding the present facility to a frequent-access Visitor Centre, using cost-effective, astronomically-friendly lighting and providing a display area and multimedia theatre with webcasts of events.	University of Calgary	$520,000	$280,000	Other/ Multi-discipline
02-041	Collaborative Science Toys	Using collaborative tools and new media learning to create a series of musical, visual networked toys and Internet experiences, that brings experimental science research to younger people (high school and college).	The Banff Centre	$236,000	$40,000	ICT
				$3,312,311	$1,656,350	

Alberta Science and Research Investments Program
Enabling Research Application and Technology Transfer Stream
PROJECT LIST 2001-2003

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-008	Commercialization of Composting Technology	The compost technology centre has been an important focal point of applied research at Olds College. Equipment required includes a windrow turner, aerated bunker and in-channel system and site renovation.	Olds College Centre for Innovation	$335,000	$133,400	Life Sciences
01-004	Innovation and Technology Development Office (ITDO)	Funding from this proposal will help to establish, develop and market a new Innovation and Technology Development Office at SAIT. The office will promote the value of practical, industry-driven technology development projects with learning-based employment for students.	Southern Alberta Institute of Technology	$2,345,128	$225,000	Other/ Multi-discipline
01-024	Development & Verification of Techniques for Locating Harmonic Sources in Electrical Systems	Field verification and improvement of a U of Alberta developed technology for electrical disturbance detection.	University of Alberta	$387,500	$95,000	Energy
01-025	Optimization of Catalysts for Production of Polyethylene	It is proposed to optimize new catalysts we have developed for application by NOVA Chemicals Corp. for commercial production of polyethylene	University of Alberta	$818,000	$150,000	Energy
01-027	Creating a Network For an Alberta-Wide Experience Base of Software Best Practices	This project aims at creating a synergy within and between Alberta software industry and the two major Alberta universities to develop an evolving experience base for "software best practices".	University of Alberta	$1,239,165	$300,000	ICT
01-028	LINC: Learning and Innovation in New Company Creation	Object-oriented framework products and tools to create effective and efficient e-business infrastructure for engineering and other professional service firms.	University of Alberta	$1,378,000	$300,000	Other/ Multi-discipline
01-036	Laser Atmospheric Pollution Measurement	A laboratory for laser atmospheric pollution detection and an important laser trace gas sensing technology will be developed by the laboratory.	University of Alberta	$1,102,000	$252,000	Other/ Multi-discipline
01-173	Combined Enhanced Biodegration of Municipal and Agricultural Waste	Biodegration of municipal & agricultural waste in: (a) Bioreactor, & (b) Biodigestor produce gas as an alternate renewable fuel, which will be used to enhance biodegration, produce hotwater & reduce greenhouse gas emissions.	University of Alberta	$380,000	$150,000	Life Sciences

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
01-078	Energy Efficiency Innovations for Buildings	Determine effective operating strategies for new building technologies including chilled slabs, seasonal passive ventilation, and innovative window blinds through studies of installations in new buildings.	University of Calgary	$147,400	$73,700	Other/ Multi-discipline
01-079	Research Transition Facility	The Research Transition Facility will provide much needed early-stage incubator space for University spin-off companies. The RTF will support commercialization, and create knowledge-based employment opportunities.	University of Calgary	$3,825,000	$1,400,000	Other/ Multi-discipline
01-127	Infrared Water Vapour Monitor	Development of an infrared water vapor monitor to commercialization as a possible Canadian contribution to the ALMA project.	University of Lethbridge	$260,000	$110,000	Other/ Multi-discipline
01-128	Protecting Intellectual Property and Maximizing the Commercial Potential of Our Discoveries	To strengthen the university's ability to manage our intellectual property and to attract Canadian industrial partners to exploit it and to facilitate the development of intellectual property managers.	University of Lethbridge	$462,000	$216,000	Other/ Multi-discipline
02-016	Microprocessing Facility	Micro-processing facility for applied research in agri-food products. R&D facility for applied agriculture, biotechnology, nutraceutical and functional food industries, training industry, college and university students.	Olds College	$3,963,006	$250,000	Life Sciences
02-017	Advanced technology network for animal behaviour/feed efficiency	To formalize a network of researchers and industry currently involved in the study of animal behavior and net feed efficiency to increase production, reduce environmental impacts of livestock and improve animal welfare.	University of Calgary	$2,479,000	$300,000	Life Sciences
02-022	A Video Streaming Platform for Wireless Applications	A new video streaming platform that prototypes an innovative video coding framework for wireless applications, which includes wireless video surveillance, wireless video conferencing and wireless distance learning applications with GPS capabilities.	University of Calgary	$471,000	$175,000	ICT
02-027	Prototyping Advanced Collaborative Environments (PACE) (From NETERA)	Pace integrates existing commercial video conferencing products with collaborative technologies just now coming out of the research lab, and creates a new set of integrated tools particularly suited for new	University of Calgary	$1,239,231	$250,000	ICT

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	ASRIP Funding Approved	Key Strategic Area
02-032	Prototyping a Novel Insturment Combining Fluorescent Microscopy	A novel instrument to enable study of surface active agents simultaneously from a macroscopic and microscopic points of view. The instrument will further understanding of biological systems such as lung surfactants and devise novel drug delivery approaches.	University of Alberta	$355,600	$100,000	Life Sciences
02-034	Super High Resolution 3D Imaging and Visualization for Medical Diagnostics	This project is aimed at contributing to easing the healthcare crisis by developing and installing new diagnostic technologies combining high resolution and 3D medical imaging with efficient delivery of these media over the internet.	University of Alberta	$1,814,984	$500,000	Life Sciences
02-036	Development of a Collaboratorium to Enable the Transfer of Space Weather Research and Information	This initiative will result in the development of "Collaboratorium Infrastructure" intended to provide access to real-time (inter)national Space Weather data and models.	University of Alberta	$624,065	$225,000	Other/ Multi-discipline
				$23,626,079	$5,205,100	

APPENDIX 2
Projects Approved Between 1997 – 2000
INTELLECTUAL INFRASTRUCTURE PARTNERSHIP PROGRAM
PROJECT LIST: 1997-1998

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	IIPP Funding Approved	Key Strategic Area
300-10-1-1	National Biomolecular Very High Field Nuclear Magnetic Resonance (NMR) Facility (NANUC)	The advanced high field NMR is used in leading edge research in structural biology and contributes to knowledge in the chemical, pharmaceutical, medical and environmental sciences. It will lead to advances in medicine such as the design of new drugs for the treatment of cancer and heart disease, and in industry, providing the most sophisticated analysis of industrial products and materials.	University of Alberta	$5,100,000	$1,000,000	Biotech
300-10-1-2	Multimedia Advanced Computational Infrastructure (MACI-1)	It will support high quality research in the sciences, engineering, medicine and the arts. Advanced research relies upon access to high speed multi-media computing. The project entails the purchase and installation of high performance computing equipment at both the U of A and the U of C as well as the provision of high speed interconnection networks.	University of Alberta University of Calgary	$1,920,000	$800,000	ICT
300-10-1-3	Lab for Laser Applications in Natural Resource Industries	The equipment consists of a state-of-the-art laser and detector systems. The main thrust of the research program will be to investigate and develop laser and spectroscopic-based techniques for the identification, measurement and characterization of materials of importance for the oil, mining and forestry industries.	University of Alberta	$866,818	$345,909	Energy
300-10-1-4	Confocal Microscope for Experimental Oncology Cellular Imaging Facility	The confocal microscope provides the means to develop three-dimensional images and to view changes in living tissue over time. The microscope will allow researchers to study cancerous cells and learn how they function differently from normal cells, and how their growth and multiplication can be more readily controlled.	University of Alberta Cross Cancer Institute	$962,150	$466,050	Health
300-10-2-2	Enhanced Bio-NMR Facility, High Field Solid State Nuclear Resonance Facility	Magnetic Resonance Spectroscopy provides information on the chemical and three-dimensional structure of molecules. It allows researchers to study proteins, carbohydrates and nucleic acids. An understanding of the function of these bio-molecules provides the necessary background knowledge that contributes to development of new drugs and treatments in medicine, to improved products in agriculture, and to a cleaner environment.	University of Calgary	$1,850,000	$500,000	Biotech.
300-10-2-3	Provincial Centres of Health/Biomedical Research and Training	These state-of-the-art laboratories, specialized containment rooms and related spaces will strengthen Alberta's biomedical research base by facilitating an increase in the development of new biomedical and health research programs that will build on the Faculty of Medicine's strengths in molecular medicine and health outcomes research.	University of Calgary	$4,200,000	$500,000	Biotech.
300-10-2-4	Level 3 Containment Facility	The Level 3 facility will significantly enhance Alberta's research capabilities with specific Level 3 pathogens and it will provide an opportunity for Alberta scientists to participate in the development of new generation vaccines.	University of Calgary	$1,920,000	$280,000	Health
		Totals:		**$16,818,968**	**$3,891,959**	

INTELLECTUAL INFRASTRUCTURE PARTNERSHIP PROGRAM
PROJECT LIST: 1998-1999

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	IIPP Funding Approved	Key Strategic Area
300-10-1-6	Computing Science Research Laboratory and Space	It will house: research labs in eight key areas of computer science research; space for faculty, graduate students, research associates and support staff; lab and office space for the Research Institute in Multimedia Systems; and space for collaborative research projects with industry partners. It will enable the department to consolidate in a single location and create a collaborative environment.	University of Alberta	$7,008,000	$1,600,000	ICT
300-10-1-8	Modern Infrastructure for Advanced Capabilities in Molecular Biology and Biotechnology	The project is to upgrade existing infrastructure, improve access to facilities that are in heavy demand, and provide new capabilities that are not currently available in the Department of Biological Sciences.	University of Alberta	$3,636,387	$1,305,690	Biotech.
300-10-1-10	Electrical and Computer Engineering Research Facility (ECERF)	ECERF will be constructed to accommodate a major expansion of the University's research activities in several areas of electrical and computer engineering. It will encompass aspects of information technologies, telecommunications, computer software engineering, advanced laser applications, microelectronics and microfabrication.	University of Alberta	$10,500,000	$4,200,000	ICT
300-10-1-11	Institute of Biomolecular Design (IBD)	To establish an interdisciplinary collaborative effort by combining the research areas of bio-organic chemistry, structural biochemistry, molecular biology, and pharmaceutical sciences. IBD's central research focus is Project CyberCell.	University of Alberta	$19,872,956	$3,900,000	Biotech.
300-10-1-12	Food for Health Innovations	A major collaborative program involving the U of A, U of C, AAFRD, AAFC and industry. The request is to support infrastructure in four key strategic areas: human nutrition; agri-food processing research; dairy, poultry, beef and swine research; and molecular biology.	University of Alberta	$7,348,000	$2,939,000	Health
300-10-1-13	Multimedia Advanced Computational Infrastructure - Phase II (MACI-2)	MACI-2 is phase two of a collaborative project between the universities of Alberta, Calgary, and Lethbridge. It will provide an set of shared computational, multimedia and broadband network resources to support private sector, university, and government researchers throughout Alberta.	University of Alberta University of Calgary	$16,040,000	$4,360,000	ICT
300-10-1-16	Geotechnical and Geoenvironmental Cold Regions Research Facility	The facility will be used to prevent future environmental pollution and to improve the existing environment by studying the characteristics and mirgration processes of hydrocarbon and other contaminents under adverse conditions. It will also be used to examine ways to protect the municipal infrastructure such as roads and buried services from the adverse climatic effects.	University of Alberta	$625,000	$250,000	Energy
300-10-1-17	Confocal/Multiphoton Imaging Facility	Multiphoton imaging can be used to follow the dynamic processes of living cells and to obtain information about the cellular processes at the molecular level. The research supported by the infrastructure will make significant contributions to knowledge of cellular, molecular and developmental biology, as well as an understanding of the molecular mechanisms of disease, develop new methods for diagnosing and treating human diseases.	University of Alberta	$976,181	$341,663	Health
300-10-2-6	Calgary Centre for Innovative Technology	To construct and equip a new wing to the Engineering Building to house six common and eig specialized labs. The objective of the CCIT propos is to focus the resources of the Faculty to support strategic research programs with strong links to industry and build critical mass in areas of existing strength.	University of Calgary	$35,099,204	$13,862,700	Energy

300-10-2-8	Electron Beam Facility for High Resolution Imaging and Micro-Analysis	These instrument will be used in a large variety of disciplines in the study of alloys, polymer studies, mechanical and chemical properties of thin films, physical and chemical properties of nanostructures, high resolution determination of biological macromolecular complexes, and studies to determine the localization of particular molecules in cells and tissues.	University of Calgary	$2,030,000	$800,000	Biotech
300-10-2-9	Two-Photon Laser Scanning Confocal Microscope	This instrument will have a long lasting impact in research that is investigating the mechanisms by which activity in the brain and the heart are regulated. They will discover basic mechanisms in the prevention of blindness and poor eyesight. Finally this infrastructure will be an important tool to discover what controls the abnormal growth of cancer and the normal well regulated growth of developing embryos.	University of Calgary	$601,444	$177,200	Health
300-10-2-10	Electron Probe Microanalyzer	Purchase electron probe microanalyzer (EPMA) to replace an obsolete machine. Instrument is essential for materials research.	University of Calgary	$1,196,000	$478,000	Energy
300-10-2-11	Assessment of Major Biogeochemical Cycles using Stable Isotope Techniques	By using characteristic chemical "finger-prints" - so-called stable isotope ratios - the team will elucidate the fate of industrial sulfur emissions from sour gas processing plants in Western Canada and the fate of carbon dioxide emissions resulting from the utilization of fossil fuels. Also, the consequences of the use of nitrogen-containing fertilizers and manure by the agricultural industry on the water quality in rivers and groundwater will be investigated.	University of Calgary	$497,000	$199,000	Energy
300-10-2-12	Collaborative Earth and Environmental Science Research Initiative	Facilitate research into the complex relationships between earth and human systems. These problems include ground water supply and quality, ecosystem protection and management, the impact of climate change, and the assessment of human adaptation to environmental change. The research is based on newly emerging tools of geographic information systems (GIS), remote sensing, geophysical imaging and remote environmental monitoring.	University of Calgary	$500,000	$200,000	Climate /Environ.
300-10-3-2	Science Annex: Agricultural Biotechnology & Water Resources	A laboratory to house infrastructure for research on agricultural biotechnology with specific topics of strategic importance to the University, namely plant biotechnology and water resources. The building will house a phytotron (facility for growing plants in controlled enviroments) and greenhouses, together with a space for sample preparation and analysis, an equipment room for shared equipment and a number of laboratories.	University of Lethbridge	$2,653,044	$1,544,000	Biotech
300-10-1-18	Ultrahigh Vacuum Surface Analysis Facility	Equipment to analyze the surfaces of materials for chemical composition, structure, electronic properties, and function under conditions of ultra-high vacuum and varying temperature. The infrastructure will support research in several areas of interfacial phenomenon including catalytic reaction engineering, materials wear and corrosion, and mineral and oil sands extraction and processing.	University of Alberta	$1,760,000	$704,000	Energy
	Total:			$110,343,216	$36,861,253	

INTELLECTUAL INFRASTRUCTURE PARTNERSHIP PROGRAM
PROJECT LIST: 1999-2000

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	IIPP Funding Approved	Key Strategic Area
300-10-1-27	Innovative Instrumentation for Advanced Proteome Research	Equipment to develop new technologies for proteome research	University of Alberta	$1,440,115	$576,000	Biotech.
300-10-2-16	Multi-Sensor Lab for Real-Time Positioning and GIS Applications	Equipment to establish a multi-sensor laboratory in the department of Geomatics Engineering	University of Calgary	$1,995,000	$664,000	Energy
300-10-1-23	Nuclear Magnetic Resonance for New Catalysts, Drugs and Materials	To expand the high resolution NMR facility for teaching with 'hands on operation' by as many students as possible. The Department of Chemistry and its Organic and Inorganic Faculty are the primary users of this infrastructure.	University of Alberta	$750,000	$260,000	Biotech.
300-10-1-24	Image-Guided Adaptive Radiotherapy (IGAR)	Equipment for state-of-the-art clinical research in oncology and medical physics	University of Alberta	$2,400,000	$957,000	Biotech.
300-10-3-4	NeuroScience Building	Construction and equipping of new building to accommodate neuroscientific and related research	University of Lethbridge	$8,596,984	$4,500,000	Biotech.
300-10-1-21	Canadian National Site Licensing Project	Funding to help purchase site licenses for electronic journals at Alberta universities' research libraries	Universities of Alberta; Calgary Lethbridge; & Athabasca	$5,388,800	$2,155,600	ICT
300-10-2-20	Protein Identification and Analysis by mass Spectrometry	Equipment for proteomics and related research	University of Calgary	$1,735,123	$788,123	Biotech.
300-10-2-23	Antennas for New Generations of Wireless Systems	Equipment to establish an integrated facility for the design, simulation, and measurement of advanced antennas	University of Calgary	$363,100	$137,300	ICT
300-10-2-26	Solid State Structure Determination by CCD Single Crystal X-Ray Diffractometer	Instrumentation for X-ray diffraction and structural characterization	University of Calgary	$443,000	$169,000	Biotech.
300-10-2-27	Laser Cooling and Imaging of Ions	Instrumentation for laser cooling and ion trapping	University of Calgary	$497,093	$199,000	Energy
300-10-2-18	Renovations and Expansion of the Life Science's Research Station	Construction and equipment for research conducted at animal care facility	University of Calgary	$11,800,000	$8,000,000	Biotech.
300-10-1-20	Food for Health Innovations Phase 2	Equipment and modernization of facilities for research into swine nutrition and reproduction, agri-food processing technologies, and human nutritional studies	University of Alberta	$6,560,000	$3,160,000	Agric.
300-10-2-24	Integrated Thermal Characterization	Equipment to comprise state-of-the-art thermal characterization facilities for analysis of materials	University of Calgary	$760,000	$190,000	Energy
300-10-2-29	Child Health Research Centre	Construction and equipping of a building for research and related activities	University of Calgary	$15,129,000	$690,000	Biotech.
300-10-1-25	Infrastructure for Research on Performance Assessment Structural Materials	Equipment and modernization of facilities for research into engineered materials and for full-scale structural testing	University of Alberta	$2,200,000	$ 845,300	Other
300-10-2-22	An Integrated System for Compound Identification and Analysis	Equipment for state-of-the-art compound-specific analysis isotope analysis	University of Calgary	$469,200	$187,450	Other
300-10-2-25	Rozsa Centre Multimedia Performance Gallery	Construction and equipping of a state-of-the-art facility for multimedia research and performance	University of Calgary	$1,600,000	$550,000	Other
	Totals:			$62,127,415	$24,028,773	

SCIENCE AND RESEARCH FUND
PROJECT LIST: 1997-1998

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	S&R Funding Approved	Key Strategic Area
01406-003-01	National Biomolecular Nuclear Magnetic Resonance (NMR) Facility (NANUC)	The advanced high field NMR is used in leading edge research in structural biology and contributes to knowledge in the chemical, pharmaceutical, medical and environmental sciences. It is expected that research results from this facility will lead to advances in medicine such as the design of new drugs for the treatment of cancer and heart disease, and in industry, providing the most sophisticated analysis of industrial products and materials.	University of Alberta	$5,352,000	$1,552,000	Biotech.
01406-003-02	PIMS: Mathematical Program for Industry and Education	PIMS is dedicated to promoting all aspects of the mathematical sciences by stimulating, coordinating and facilitating the activities of the mathematical scientists in Alberta and BC by linking them more closely with those in industry, business, government sectors, and mathematical scientists in the rest of the world. Disciplines include pure and applied mathematics, statistics, computer science, physical, chemical and life sciences, medical science, finance, management, and several engineering fields.	University of Alberta	$1,485,000	$110,000	Other
01406-003-03	Level 3 Containment Facility	The Level 3 facility will significantly enhance Alberta's research capabilities with specific Level 3 pathogens and it will provide an opportunity for Alberta scientists to participate in the development of new generation vaccines.	University of Calgary	$2,320,000	$420,000	Health
01406-003-04	Advanced Internet in Alberta: Expansion and Enhancement (NETERA)	The project's objective is to provide Alberta with a world class "next-generation" Internet research network to foster the development of a knowledge based economy and to attract highly skilled persons to new jobs in key application areas: health, education, telecommunications, earth resources and entertainment.	University of Calgary	$5,700,000	$1,112,000	ICT
01406-004-05	Enhanced Bio-NMR Facility, High Field Solid State Nuclear Resonance Facility	Magnetic Resonance Spectroscopy will allow researchers to study proteins, carbohydrates and nucleic acids. This infrastructure will enable a research team to study non-soluble proteins with potential applications to the agriculture, medical and oil and gas sectors.	University of Calgary	$3,365,178	$150,000	Biotech.
		Totals		$18,222,178	$3,344,000	

SCIENCE AND RESEARCH FUND
PROJECT LIST: 1998-1999

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	S&R Funding Approved	Key Strategic Area
01406-004-03	Microfabrication and Characterization Facility	The technology involves highly miniaturized electrical and mechanical systems for automated chemical, biological and medical sensing, measurement and analysis. Microfabricated devises and materials are expected to have an enormous impact on society in the next century and afford tremendous commercial opportunities.	University of Alberta	$6,000,000	$1,890,000	Energy
01406-004-13	Laboratory for Laser and Spectroscopic Applications in the Natural Resource Industries	The equipment consists of a state-of-the-art laser and detector systems. To investigate and develop laser and spectroscopic-based techniques for the identification, measurement and characterization of materials of importance for the oil, mining and forestry industries.	University of Alberta	$2,676,000	$346,000	Energy
01406-004-14	Research Infrastructure for the Electrical and Computer Engineering Research Facility (ECERF)	Computer Communications and Infrastructure for ECERF; Clean Room Facilities for the Nanotechnology and Microdevices Group; & Research infrastructure for the Communications Laboratories.	University of Alberta	$12,400,000	$1,918,000	ICT
01406-004-18	PIMS: Mathematical Programs for Industry and Education	Disciplines include pure and applied mathematics, statistics, computer science, physical, chemical and life sciences, medical science, finance, management, and several engineering fields. Development of industrial contacts leading to effective collaboration between academic researchers and their counterparts in industry to solve applied problems of commercial importance.	University of Alberta University of Calgary	$7,920,000	$600,000	Other
01406-004-19	Research Chairs Program in Biofilms, Biomaterials and Biomechanics	Expertise in Biofilm research at the U of C (Faculties of Medicine, Engineering and Science) will be solidified by the formation of the two Chairs in Biofilm Research. The Chairs will work together with Alberta industry to produce processes and products to control biofilms that can be ultimately commercialized.	University of Alberta University of Calgary	$6,000,000	$2,000,000	Biotech.
01406-004-05	Enhanced Bio-NMR Facility, High Field Solid State Nuclear Resonance Facility	Equipment will allow researchers to study proteins, carbohydrates and nucleic acids. An understanding of the function of these bio-molecules provides the necessary background knowledge that ultimately contributes to developments of new drugs and treatments in medicine, to improved products in agriculture, and to a cleaner environment.	University of Calgary	$1,475,000	$350,000	Biotech.
01406-004-15	Centre for Transportation Engineering & Planning	Will provide technology transfer services and research facilitation for Alberta institutions and corporations involved in transportation engineering and planning. The Centre serves the research and technology transfer needs by acting as a central clearinghouse/coordinating body for information and research needs relevant to its members.	University of Calgary	$1,832,000	$600,000	Other
01406-004-16	Electron Beam Facility for High Resolution Imaging and Microanalysis	Instrument to study of alloys, polymer studies, mechanical and chemical properties of thin films, physical and chemical properties of nanostructures, high resolution determination of biological macromolecular complexes, and studies to determine the localization of particular molecules in cells and tissues	University of Calgary	$2,000,000	$100,000	Biotech.
01406-004-12	Pharmaeconomics and Health Outcomes	To advance the Institute for Pharmaco-Economics from its current position into a centre of excellence. Pharmacoeconomics is the evaluation of the costs and benefits of drug products and policies from the multiple perspectives of patients, drug insurance companies, health care providers, provincial or regional health bodies and society at large.	Institute of Pharmo-Economics	$1,652,000	$375,000	Health

01406-004-02	Global Communications Centre	The Centre will add value to education and to Industries both locally and provincially. The centre will enhance SAIT's reputation and influence in applied research with a resulting positive, economic and social impact.	Southern Alberta Institute of Tech.	$25,500,000	$3,500,000	ICT
01406-004-11	Technology and Incubation Services	Technology commercialization and incubation services including specialty interior infrastructure such as: laboratories; smart (wired) offices with high speed communications systems; prototype manufacturing environment; and a networking areas to facilitate advanced technology company creation and growth.	Calgary Research and Development Authority	$7,022,000	$1,500,000	Tech. Comm.
01406-004-07	Monitoring Forest Biodiversity	To build a comprehensive, long-term monitoring program that will measure success towards the goal of sustainable development in Alberta's forests. Such a program would confer strategic advantages to the forestry and energy sectors, and would contribute to the reporting mandate of National Parks and other protected areas.	Foothills Model Forest	$540,400	$150,000	Energy Forestry
01406-004-04	Burned Wood Processing	To determine the effect of moderate and severely fire damaged wood and harvesting delays on the quality of pulp produced by kraft, thermo-mechanical, and pressurized chemithermo-mechanical pulping processes. To determine the technical and economical feasibility of recovering fibre from moderate and severely damaged wood using current equipment.	Mechanical Pulping Consortium	$1,575,000	$345,000	Agricultur / Forestry
01406-004-17	Byproducts Synergy	A practical application of industrial ecology in which companies work together in a given region to match feedstock needs to by-products. Through the BPS process, individual companies are transformed into a cross-industry team focused on turning every gram of material running through their plants into product.	International Institute for Sustainable Development	$300,000	$40,000	Other
01406-004-09	Canada-Wide Science Fair	The national level of competition for students interested in pursuing an interest in science that extends beyond the classroom (Project-based Science). This event has been held annually since 1961 and a bidding process must be followed by any local organization interested in hosting a CWSF.	Edmonton Host Committee	$549,000	$44,000	Science Awarenes
01406-004-10	NetWorks: Understanding Telecom	To provide teachers and their students, librarians and community group leaders access to the pool of scientific and technological expertise in telecommunications and foster science and technology as areas of interest and create an interest in these areas as potential career choices.	Science Alberta Foundation	$580,000	$75,000	Science Awarenes
01406-004-08	Enhanced Science and Technology Hotlines	To connect Volunteer scientists, technologists, engineers and mathematicians with teachers, students (grades K-12) and the public to develop and promote scientific and technological literacy by increasing their knowledge and enthusiasm.	Science Alberta Foundation	$244,280	$198,500	Science Awarenes
01406-004-01	Feasibility Study for the Creation of a Bioscience Technology Development	Study the concept for a Biotech Centre in Edmonton. Construction of a new technology infrastructure in Alberta will support the development of emerging companies with biotechnology products for the health, agriculture and environment sectors.	Economic Development Edmonton	$120,000	$90,000	Science Awarenes
01406-004-06	BioAlberta	Connect the biotechnology community to work together towards the benefit of the overall industry. As the provider of valuable marketing, networking, education, and information services, BioAlberta actively contributes to the success of individual companies and, ultimately, to the growth of the Alberta biotechnology industry as a whole.	Alberta Biotechnology Association	$700,000	$300,000	Biotech.
	Totals:			$79,085,680	$14,621,500	

SCIENCE AND RESEARCH FUND
PROJECT LIST: 1999-2000

Project Number	Project Title	Descriptive Summary	Lead Organization	Total Project Cost	S&R Funding Approved	Key Strategic Area
99-03	Assessing Fluid Flow Characteristics in Bioturbated Media	A research program focusing on burrow related dolomotization and it's impact on resevoir quality, fluid flow, and well log analysis. The applications of this research allow measurement of the fluid flow characteristics of a newly discovered oil bearing reservoir and will also aid in secondary crude oil recovery techniques.	University of Alberta	$190,000	$125,000	Energy
99-10	Flow Cytometer for Detection and Evaluation of Disinfection of Human Protozoa, Giardia and Cryptosporidium in Drinking Water	To assess the viability of the population of parasites using fluorescence activated cell sorter aided analyses and develop standardized methodology for use by the water industry.	University of Alberta	$646,000	$131,000	Health
99-14	U of A Research Transition Facility	The University will convert existing building space to provide synergistic, clustered services on campus to support the creation and early-stage growth of spin-off or associated companies.	University of Alberta	$3,572,000	$1,500,000	Tech. Com.
99-15	Sources, Deposition and Bioaccumulation of Mercury in Alberta	Project will establish a well-equipped mercury clean-room facility to evaluate regional and long-range sources, biogeochemical pathways and potential biological effects of mercury on lakes in Alberta	University of Alberta	$610,000	$305,000	Health
99-16	Equipment Infrastructure for Olefin Polymerization Laboratory	Acquisition of this equipment will create a state-of-the-art laboratory for catalysis, with unique capabilities. Will interface directly with industry and chemical engineering.	University of Alberta	$546,237	$91,500	Tech. Com.
99-17	Development of a Wear/Surface Protection Program	Will provide equipment (triboscope and scanning Kelvin probe) and conduct research relevant to industry	University of Alberta	$1,225,000	$499,800	Energy
99-19	Biotechnology Training Centre	A facility to instruct students in state of the art techniques in biotechnology including molecular biology, microbiology, molecular diagnostics, protein biochemistry, electrophysiology and cell injection technology. A computer instruction lab will be used for instruction in molecular genomics, proteomics, bioinformatics and molecular modeling.	University of Calgary	$853,000	$493,000	Biotech
99-23	Canadian Process Tomography Consortium	Requested funds include upgrading and purchase of equipment, and maintenance. Lab will support research in energy, chemical, environment, and medical sectors.	University of Calgary	$3,190,000	$435,000	Energy
99-27	Translational Molecular Biology Research in Breast Cancer	Objectives include creation of a clinical/ pathologic/ outcome data base of breast cancer patients, technical infrastructure, and establish an applied molecular biology research partnership.	University of Calgary	$1,832,000	$525,000	Health
99-29	Infrastructure for Shallow Geophysical Studies	Will provide infrastructure equipment, such as ground penetrating radar, distributed seismic data acquisiton system to develop a field data acquisition system.	University of Alberta	$1,836,000	$776,000	Energy
99-59	A Diode Laser Based Gas Sensor for Environmental Monitoring	Will establish a research program to explore potential of mid-infrared diode laser spectrometer for use in real time trace-gas monitoring applications.	University of Alberta	$264,500	$58,500	Health
99-60	Development of the Alberta Plant Diversity and Conservation Centre	Primary method of assessing environmentally sound development is through assessing biodiversity. Goal is to integrate all plant occurrence knowledge and research into one centre to provide information services for all of Alberta.	University of Alberta/ Devonian Bot. Garden	$3,291,000	$100,000	Agric.
99-13	Research Infrastructure for Experimental Computing	Infrastructure to enhance the core research activities of artificial intelligence and cognitive science, database management, software engineering, communications and networks, graphics and multimedia, algorithmic, vision and robotics, and parallel and distributed computing.	University of Alberta	$2,742,000	$1,322,500	ICT

99-22	Alberta Advanced Networking Infrastructure 2002	The AANI 2002 project will extend and enhance Alberta's existing research network, Wnet, connect existing computational resources, and expand programs in training, outreach, technical support.	Netera Alliance	$27,200,000	$1,800,000	ICT
99-30	Alberta Software Engineering Research Consortium	Goals of ASERC are to foster collaborative research amongst Alberta's strong and emerging software industry, through collaborative research projects, joint workshops and software quality assessments. Four distinct areas are outlined and realistic solutions are proposed.	University of Alberta/ University of Calgary	$5,517,000	$1,800,000	ICT
99-38	Atom Manipulation Facility	The objective is to study unique arrangements of solid matter. The project will help to elucidate the fundamental properties of matter on nanometre length scales and will help in the quest to further miniatureize and accelerate devices used in information technology.	University of Alberta	$1,886,000	$425,000	ICT
99-41	The New Media Institute Human Centered Interface Design project	The key goal of this project is to accelerate research at The Banff Centre for the Arts in next generation new media. The Human Centered Interface project will significantly build the growth capabilities of the multimedia industry in Alberta.	Banff Centre	$7,717,500	$600,000	ICT
99-58	Polymeric Organic Materials for Applications in Information and Communications Technology	The project integrates all aspects of synthesis and evaluation of polymeric organic electro-optic and nonlininear optical (NLO) materials and targets the incorporation of suitable polymers into photonic devices that are essential to emerging telecommunications technology.	University of Alberta	$1,367,000	$259,000	ICT
99-09	Alberta Science Literacy Association Science Education Outreach Project	To provide teachers and their students, librarians and community group leaders access to the pool of scientific and technological expertise available in Alberta by connecting them directly with scientists, technologists, engineers and mathematicians.	Alberta Science Literacy Assn/Science Alberta Foundation	$4,134,000	$270,000	Science Awarenes
99-48	Constructing Knowledge Communities in Face-to-Face and Virtual Environments	The project plan involves a partnership with government, industry and post-secondary institutions to develop an innovative model of teacher development that will develop a province-wide network of school-based Centres of Excellence in technology integration; contribute to educational research into technology integration.	The Galileo Educational Network Association (at UofC)	$4,945,000	$600,000	Science Awarenes
99-65	Scientist 2010 Computers	Computers and related software for longitudinal study on computer use by students.	Edmonton Space & Science Centre	$3,500,000	$100,000	Science Awarenes
99-01A	Alberta Cancer Board Medical Cyclotron Facility	The facility will promote clinical and basic research into development of new imaging radiopharmaceuticals, facilitate basic research into physiology of disease, provide routine imaging, and function as a high-technology.	Alberta Cancer Board/ University of Alberta	$6,654,800	$2,200,000	Health
99-02A	Centre for the NMR Evaluation of Human Function and Disease	This project investigates by means of nuclear magnetic resonance the functioning of the normal human body and changes brought about by disease, disorders and injuries.	University of Alberta	$12,355,730	$4,382,000	Health
99-03A	Nutraceutical Treatment of Mental Disorders	To Evaluate the effectiveness of a nutrient supplement for symptom relief in mental illness.	University of Calgary	$926,957	$588,757	Health
99-04A	Electron Probe Microanalyzer	An EPMA is used for non-destructive chemical and image analysis of small selected areas of virtually any solid material, natural or synthetic. It is increasingly recognized as a base level instrument for modern geochemical and materials science research.	University of Calgary	$1,611,000	$180,000	Energy
99-05A	Flaring Technology Research Program	This flaring research program is being conducted within an overall strategy of minimizing both flaring and the release of harmful products of incomplete combustion to the atmosphere.	Canadian Association of Petroleum Producers	$373,000	$373,000	Energy

99-06	Carbon Dioxide Sequestration in Geological Media in Alberta	Project aims to identify, characterize and establish on a local scale the CO2 capacity of specific geoligical sites in the vicinity of major power, cement, petrochemical, oil sands and gas plants in Alberta.	Alberta Energy and Utilities Board	$800,000	$240,000	Energy
99-11	Information-Based Decision Support Systems for Process Industries	An intergrated, information-based decision support system that will solve applications-driven problems in real time. The IBDS Systems will monitor large volumes of data, extract the information to predict and identify potential problems, and make decisions about action to be taken to avoid equipment failures, process shutdowns, product-quality, environmental violations, etc.	University of Alberta	$925,000	$925,000	ICT
99-12A	Glaxo Wellcome - Virology Chair	Support for a Chair in viral pathogenesis at the University of Alberta Faculty of Medicine and Dentistry.	University of Alberta	$1,250,000	$1,250,000	Health
99-18	Sustainable Development of Coalbed Methane: Phase IIIA	Phase III consists of two parts: A) efficient surface facility designs both at a commercial and pilot scale and testing a synthetic 'flue gas' composition in a micro-pilot (single well test) in a new well to be drilled; B) optimum strategy for full-scale pilot will be finalized.	Alberta Research Council Inc	$2,800,000	$1,500,000	Energy
99-26	Fundamental Geomechanics for Geological Sequestration of Greenhouse Gasses	Project will 1) develop experimental infrastructure to assess geological formations; 2) conduct experimental program on sequestration in coalbed methane resevoirs; 3) integrate geomechanical models into numerical simulation software.	University of Alberta	$821,000	$627,000	Energy
01406-006-04	Institute for Health Economics (Development of Excellence in integrated research)	An Alberta wide initiative to foster growth and academic capacity in health economics and health outcomes research and education.	Institute of Health Economics	$1,325,000	$1,325,000	Health
	Totals:			$106,906,724	$25,807,057	